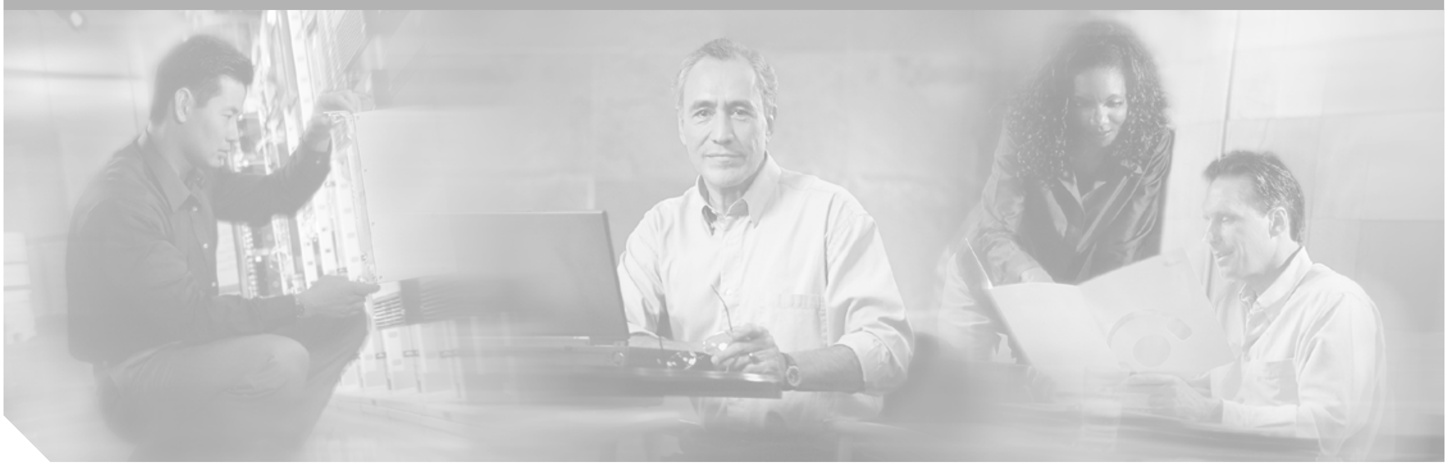


Cisco AC/DC Power System User Guide

Release 1.0
Last Updated: May 15, 2005

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TABLES



About this Guide

This section explains objectives, intended audience, and organization of this publication and describes conventions that convey instructions and other information.

This section provides the following information:

- Document Objectives
- Audience
- Document Organization
- Document Conventions
- Where to Find Safety and Warning Information
- Obtaining Documentation
- Documentation Feedback
- Obtaining Technical Assistance
- Obtaining Additional Publications and Information

Document Objectives

This user guide explains installation, operation, and troubleshooting for the Cisco AC/DC Power System.

Audience

To use this publication, you should be familiar with Cisco or equivalent AC/DC power systems hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Document Organization

This *Cisco AC/DC Power System User Guide, R1.0* is organized into the following chapters:

- Chapter 1, "Introduction," provides system and component descriptions, system configurations, system specifications, and safety considerations.

- Chapter 2, "System Installation," provides the unpacking procedure, safety considerations, installation process, system upgrade information, and initial system startup for the power system.
- Chapter 3, "Component Replacement," provides maintenance procedures and component replacement procedures.
- Chapter 4, "System Operation," provides procedures for using the XCS control system. This includes normal system control and monitoring.
- Chapter 5, "System Troubleshooting," provides troubleshooting procedures.
- Chapter 6, "System Parts List," provides a part numbers list for the Cisco AC/DC Power System.
- Appendix A, "Translated Safety Warnings," provides translations of all the warnings used in this document.

Document Conventions

This publication uses the following conventions:

Convention	Application
boldface	Commands and keywords in body text.
italic	Command input that is supplied by the user.
[ ]	Keywords or arguments that appear within square brackets are optional.
{ x | x | x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one.
Ctrl	The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key.
`screen font`	Examples of information displayed on the screen.
`boldface screen font`	Examples of information that the user must enter.
< >	Command parameters that must be replaced by module-specific codes.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

Caution Means *reader be careful*. In this situation, the user might do something that could result in equipment damage or loss of data.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Where to Find Safety and Warning Information

For safety and warning information, refer to the *Cisco Optical Transport Products Safety and Compliance Information* document that accompanied the product. This publication describes the international agency compliance and safety information for the Cisco ONS 15xxx systems. It also includes translations of the safety warnings that appear in the ONS 15xxx system documentation.

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http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID

or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

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- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

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- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html



CHAPTER 1

Introduction

The Cisco AC/DC Power System is a rack-mounted, AC-to-DC power system that provides a scalable, compact solution for powering optical platforms at site locations with only AC power available. The system accepts AC inputs and converts them to nominal -48 VDC for DC-powered equipment. This compact system provides N+1 redundancy in rectifiers, automated alarm generation, and integrated DC power distribution through a GMT fuse panel and available four-position 1RU circuit breaker distribution shelf. This system provides nomimal -48 VDC service to DC-powered network elements (NEs) through redundant feeds, complementing the resiliency of Cisco's line of Carrier Class optical products.

The Cisco AC/DC Power System is designed to be mounted in a variety of rack types including IEC, ANSI (19 inches), ANSI (23 inches), and ETSI configurations and requires only 177.8mm (7.0in.) of vertical space for medium and large systems and 133.4mm (5.25in.) for small systems. The system is based on the CSCO-PWR-RECT rectifier module and allows three different configurations based on load requirements that range from 13.3A to 96A. Additionally, power distribution is accomplished using a GMT fuse block and/or an optional 1 RU distribution shelf (depending on system size).

The Cisco AC/DC Power System offers these features:

- AC input (A) 100-120VAC
- AC input (B) 200-250VAC
- Nominal -48 VDC rectifier providing up to 1600W
- Front access design
- Temperature hardened -40ºC to +55ºC
- Available in 19in. (IEC and ANSI), ETSI (21in. inside [610mm]), or 23in. mounting arrangements
- Available external distribution shelf with up to 4 load circuit breakers
- 10 position GMT fuse panel
- Active high power factor correction
- 90% or greater efficiency
- Front panel LCD interface

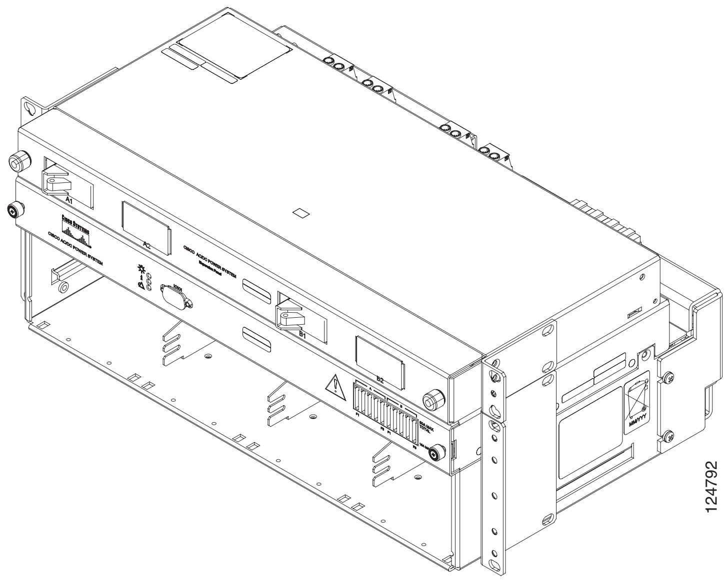
1.1 System Description

This section provides descriptions of the system shelf, rectifier modules, GMT fuses, and the 1 RU distribution shelf.

1.1.1 System Shelf

The AC/DC power system shelf consists of four rectifier slots and system monitoring/control interfaces. The system controller provides rectifier monitoring, operational data collection, alarm generation, and intra-system communications regulation.

Figure 1-1 Cisco AC/DC Power System (with Optional 1RU DC Distribution Shelf)



There are two system shelves, one of which has an LCD display on the front of the shelf.

Figure 1-2 shows a front view of the version of the system shelf with the LCD screen. The optional 1 RU DC distribution shelf is also shown.

Figure 1-2 Component Locations (Front View) on the System Shelf with LCD Screen

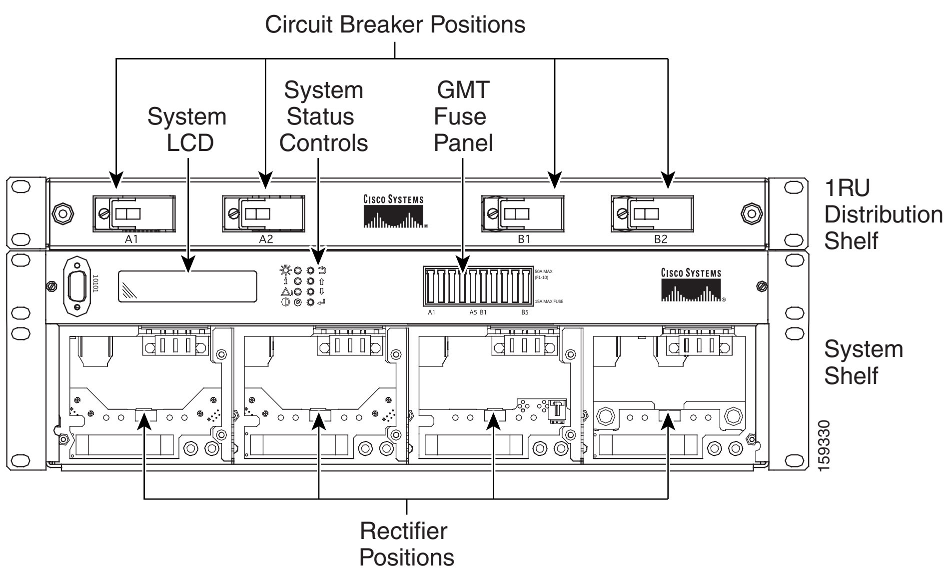
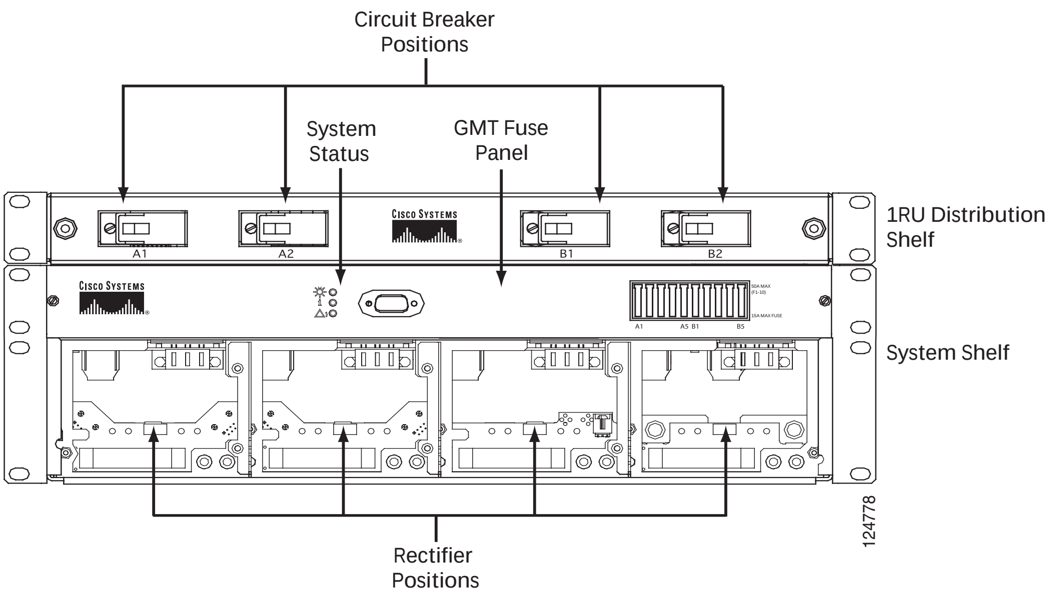


Figure 1-3 shows a front view of the version of the system shelf that does not have an LCD screen. The optional 1 RU DC distribution shelf is also shown.

Figure 1-3 Component Locations (Front View) on the System Shelf without an LCD Screen

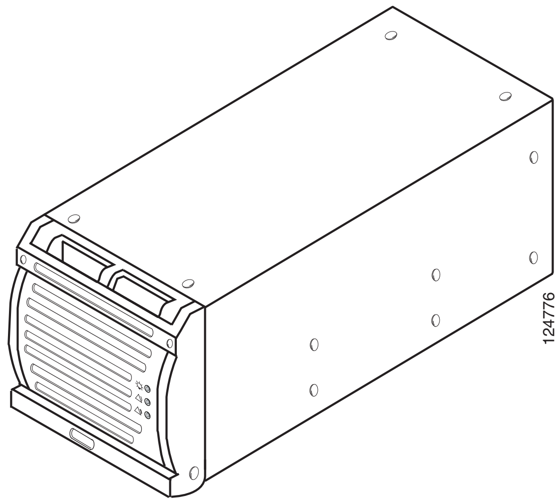


1.1.2 Rectifier Modules

AC-to-DC power conversion is accomplished using two, three, or four hot-swappable CSCO-PWR-RECT rectifiers, each with an output voltage of nominal -48 VDC. Figure 1-4 shows a CSCO-PWR-RECT rectifier module.

Note The output voltage range is set at the factory and is not user configurable.

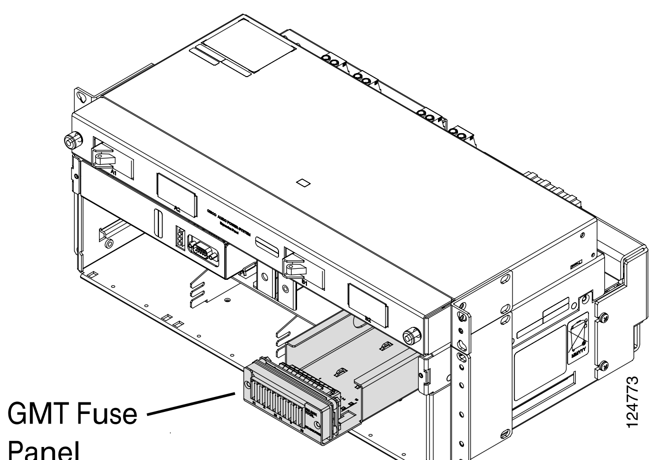
Figure 1-4 CSCO-PWR-RECT Rectifier Module



1.1.3 GMT Fuses

The system shelf is equipped with a 10-position GMT fuse panel. The GMT fuse panel has a 50A maximum total capacity with a maximum fuse rating of up to 15A (for up to three positions). The fuses are alarmed and are reported through the system controller.

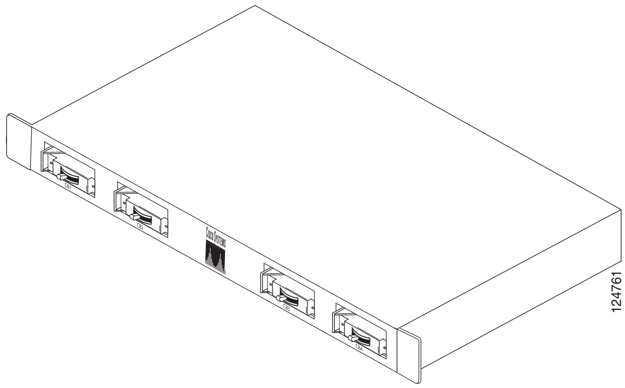
Figure 1-5 GMT Fuse Panel



1.1.4 1 RU Distribution Shelf

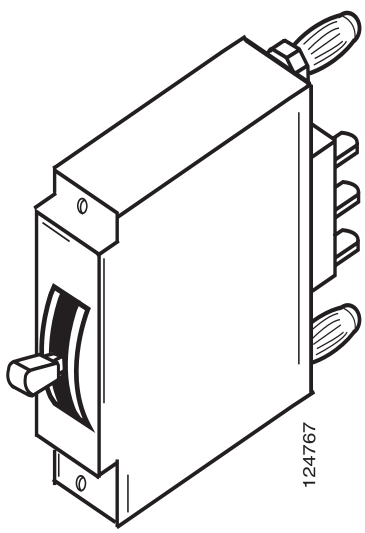
The optional 1RU Distribution Shelf is installed in systems that contain more than 2 rectifiers and acts as an additional protection point for system loads. The shelf has a rating of 96A and can be equipped with up to four circuit breakers (up to a maximum rating of 30A each). The breakers are alarmed through the system controller.

Figure 1-6 1 RU Distribution Shelf



The 1RU External Distribution Shelf can accommodate up to four Series-Trip circuit breaker positions. These breakers have "bullet type" connectors for quick connect and disconnect (Figure 1-7). Circuit breakers can be rated from 5A-30A.

Figure 1-7 Circuit Breaker



1.1.5 System Configurations

Table 1-1 lists the configurations available for the Cisco AC/DC Power System.

Table 1-1 System Configurations

Configuration	Rectifiers	Distribution	Output at 220V AC	Output at 110V AC
Small Systems	2 CSCO-PWR-RECT Modules	10-position GMT Fuse Block	32A	13.3A
Medium Systems	3 CSCO-PWR-RECT Modules	10-position GMT Fuse Block 4- position 1RU DC Distribution Shelf	64A	26.6A
Large Systems	4 CSCO-PWR-RECT Modules	10-position GMT Fuse Block 4- position 1RU DC Distribution Shelf	96A	40A

1.1.6 General Specifications

Table 1-2 provides cabling specifications for the Cisco AC/DC Power System.

Table 1-2 Cabling Specifications

From	To	Wire Gauge	Ampacity
System Shelf	1U DC Distribution Shelf	4 x 6AWG (16mm²) (intra-shelf cabling)	96A (max)
Circuit Breakers	Load	10 - 8AWG (6mm² - 10mm²)	30A (max)
GMT Fuse Block	Load	16 - 14AWG (1.5mm² - 2.5mm²)	15A (max)
AC Service Panel	System Shelf	3 conductor 14AWG (2.5mm²) per AC input	9.1A x (4) inputs <37A Total

Table 1-3 provides electrical specifications for the Cisco AD/DC Power System.

Table 1-3 Electrical Specifications

Electrical	Value
Input Voltage	(A) 100-120VAC (B) 200-250VAC
Input Frequency	44-66 Hz.
Transient Response	+/- 4%, recovery time 2ms
Load Sharing	+/- 5% of nominal current

Table 1-4 provides protection specifications for the Cisco AC/DC Power System.

Table 1-4 Protection Specifications

Protection	Description
Overcurrent (output)	Short circuit and automatic current limiting
Overvoltage	Selective shutdown of modules at excessive output voltages

Table 1-5 provides status and alarm specifications for the Cisco AC/DC Power System.

Table 1-5 Status and Alarm Specifications

Status & Alarms	Description
Alarm Contacts	Four form-C alarm contacts (Low Voltage, Mains Error, Module Failure, Fuse/Circuit Breaker Failure), maximum 60 VDC, rated at 1A
Status (Rectifier)	Green LED indicates power is within acceptable range Yellow LED indicates current limit/thermal protection Red LED indicates overvoltage shutdown or rectifier alarm

Table 1-6 provides mechanical specifications of the Cisco AC/DC Power System.

Table 1-6 Mechanical Specifications

Mechanical	Description
Shelf Dimensions WxHxD	17.4 x 5.25 x 10.8in. (442 x 132.9 x274mm)
1RU Shelf WxHxD	17.1 x 1.69 x 9.175in. (434 x 43 x 233mm)
Mounting	ETSI, 19in. (IEC and ANSI) or 23in.

Table 1-7 provides environmental specifications for the Cisco AC/DC Power System.

Table 1-7 Environmental Specifications

Environment	Description
Shock/Vibration	(NEBS) Level 3, Class B Certification
Earthquake	Zone 4 Compliant
Audible Noise	<60 dBA
Ambient Temperature	-40°C to 55°C
Storage Temperature	-40°C to +85°C
Relative Humidity	10-90%, non-condensing

Table 1-8 provides compliance specifications for the Cisco AC/DC Power System.

Table 1-8 Compliance Specifications

Compliance	Description
Radiated EMC	EN 61000-6-2, EN 61000-6-3, FCC Part 15 Class B
EMC	EN 61000-6-2, EN 61000-6-4
Safety	CSA C22-2 No. 60950-1, UL 60950-1 and IEC60950-1/EN60950-1
ESD Immunity	EN61000-4-2
RF Immunity	EN61000-4-3
Surge Immunity	IEC/EN61000-4-5
Fast Transient/Burst Immunity	IEC/EN61000-4-4
Immunity	EN61000-4-2
ETSI	300-386-TC

1.2 Safety Recommendations

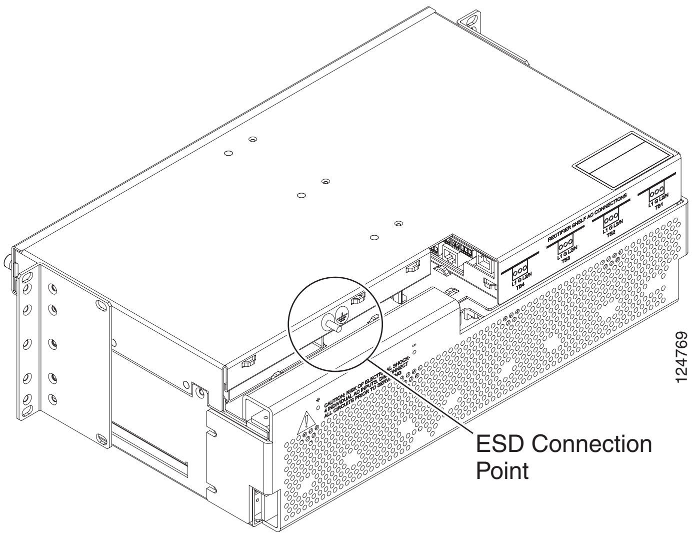
Any device that uses electricity requires proper guidelines to ensure safety.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

- The Cisco AC/DC Power System should only be installed or serviced by qualified personnel.
- An ESD wrist strap is included to protect sensitive electronics and should be connected to a metal surface to act as a ground. This ensures that all components have the same charge. An ESD wrist strap should be used when working with internal components that are installed in the shelf. The wrist strap connects at the rear of the system shelf as shown in Figure 1-8. If rear access is not available, the ESD wrist strap can be connected to the shelf mounting ears or the controller faceplate thumbscrews.

Figure 1-8 ESD Wrist Strap Connection Point



- Keep the system area clear and dust-free during and after the installation.
- Always check for possible hazards before beginning work.
- This equipment is designed to permit the connection of a grounded conductor for the DC supply circuit at the equipment.

1.2.1 Installation Warning

The following safety guidelines should be observed when transporting or moving the system to the install location:

- Before moving the Cisco AC/DC Power System, read the system specifications sheet to determine if the site meets all the size, environmental, and power requirements.
- The Cisco AC/DC Power System should be properly mounted to the equipment rack.

The Cisco AC/DC Power System is designed for installation in restricted access locations. A restricted access location is defined as an equipment location where both of the following conditions apply:

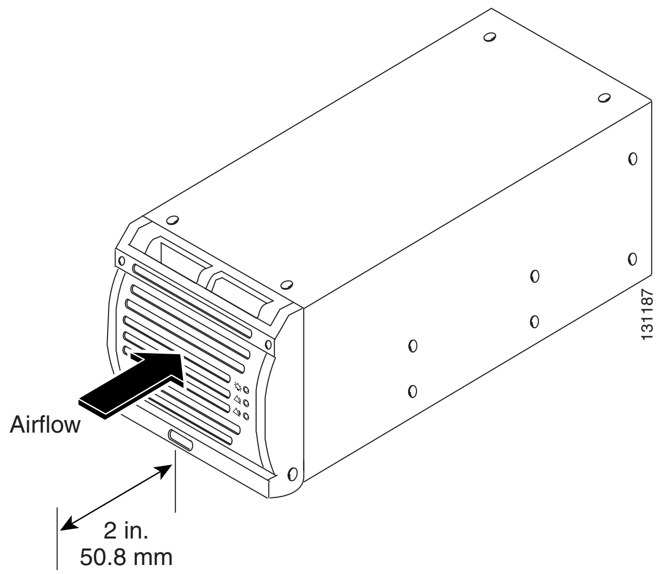
- Access can only be gained by service persons or users who understand the restrictions applied to the location and any precautions that must be taken.
- Access to the system is obtained through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

1.2.2 Operating Temperature Warnings

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 55° Celsius.**
Statement 1047

Warning **To prevent airflow restriction, allow clearance around the ventilation openings to be at least 2.0 inches (50.8 mm).**

Figure 1-9 Two-Inch Clearance Around Front Ventilation Opening



This power system is intended for use in a restricted location where the ambient temperature falls between -40° and +55° Celsius. It is not recommended to continually operate the power system in an area that exceeds the maximum recommended operating temperature. To prevent the Cisco AC/DC Power System from overheating, the rectifier automatically shuts down when a thermal alarm is tripped.

1.2.3 Electrical Safety Warnings

The following are electrical safety recommendations for working near the Cisco AC/DC Power System:

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.** Statement 12

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

- Before connecting the AC input source to the power system, always verify frequency and voltage.
- When making AC connections, all AC power and DC load distribution breakers should be in the OFF position.
- Ensure that the proper size circuit protection is being used.



System Installation

This provides step-by-step instructions for installing a Cisco AC/DC Power System. If you are installing a new system, begin with the "2.1 Pre-Installation" section on page 2-1. If you are upgrading an existing system, go to the "2.6 System Upgrades" section on page 2-28 for instructions.

2.1 Pre-Installation

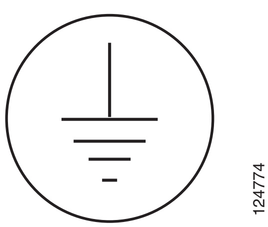
The following information should be reviewed before attempting to install the Cisco AC/DC Power System.This section includes shelf markings, tools, equipment, and an installation checklist. Refer to the "1.2 Safety Recommendations" section on page 1-8 before beginning installation.

Note Each system installation is unique, so please review specific site requirements and system configurations before installing the system.

2.1.1 Ground Symbol

Figure 2-1 shows the ground symbol located on the Cisco AC/DC Power System.

Figure 2-1 Ground Symbol



2.1.2 Tools Required

The following tools and parts are required for safe installation of the Cisco AC/DC Power System:

- Digital multimeter

- Insulated Phillips and flathead screwdriver sets
- Insulated wire & cable strippers/crimpers (for ground lug, DC cable, alarm, and GMT cable installations)
- 8mm socket or wrench for ground cable installation

2.1.3 Installation and Commissioning Checklist

- AC/DC system shelf mounted securely in rack
- 1 RU Distribution Shelf mounted securely in rack directly above the system shelf (if applicable)
- AC and DC cabling meets local and national electrical code specifications
- Installation in ETSI racks allows for front-to-back ventilation and the use of a ventilated door and cabinet top
- System alarm cabling is installed and secure
- Power cables are secure and installed correctly
- Rectifiers are installed and seated correctly in the system shelf
- The controller and 1 RU Distribution faceplates are installed and secure (if applicable)
- System shelf rear cover is installed and secured
- System powers up and all red LEDs are extinguished after a few minutes

2.1.4 Installation Materials

Table 2-1 and Table 2-2 list the Cisco supplied installation materials that ship with the Cisco AC/DC Power System. Table 2-3 lists materials that will need to be furnished at the install location.

Table 2-1 Supplied Materials for the System Shelf

Description	Qty	Use
M6 0x20mm screw (thread forming)	6	Shelf mounting screws (ETSI racks/cabinets)
12-24 x1/2” screw (thread forming)	6	Shelf mounting screws (ANSI, IEC racks/ cabinets)
M6 cage nut	6	Shelf mounting nut (ETSI racks/cabinets)
Mounting bracket 600mm ETSI rack	2	Ear mounts (ETSI racks/cabinets)
2A GMT fuse	2	GMT fuse panel
5A GMT fuse	2	GMT fuse panel
10A GMT fuse	2	GMT fuse panel
15A GMT fuse	2	GMT fuse panel
Standard AC plug	4	AC plugs that meet local requirements
Cable ties	12	Securing cables
ESD wrist strap	1	ESD protection

Table 2-1 Supplied Materials for the System Shelf (continued)

Description	Qty	Use
Quick Installation Guide	1	Installation instructions
System documentation	1	Installation, provisioning, and troubleshooting

Table 2-2 Supplied Materials for the 1 RU Distribution Shelf

Description	Qty	Use
M6 0x20mm screw (thread forming)	4	Shelf mounting screws (ETSI racks/cabinets)
12-24 x 1/2” screw (thread forming)	4	Shelf mounting screws (ANSI, IEC racks/ cabinets)
M6 cage nut	4	Shelf mounting nut (ETSI racks/cabinets)
Mounting bracket 600mm ETSI rack	2	Ear mounts (ETSI racks/cabinets)
Quick disconnect circuit breakers	2	1RU Distribution Shelf
Cable ties	4	Securing cables
ESD wrist strap	1	ESD protection
Quick Installation Guide	1	Installation instructions

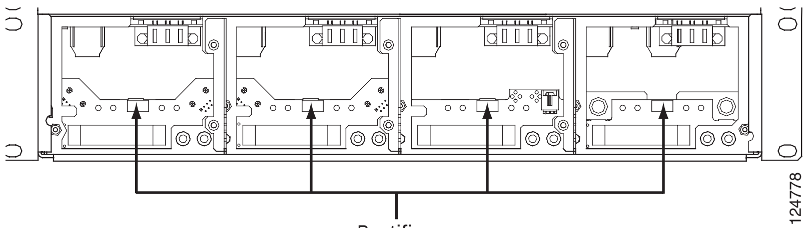
Table 2-3 Non-Supplied Materials

Description	Qty	Use
6AWG (16mm²) grounding cable	1	system shelf grounding
6AWG (16mm²) grounding cable	1	1RU Distribution grounding (if applicable)
10 to 8 AWG (6 to 10mm²) cables	<8	DC load breaker connections (-48V and return)
22 AWG (0.34mm²) cables	n/a	2A GMT fuse cabling
18 AWG (0.75mm²) cables	n/a	5A GMT fuse cabling
14 AWG (2.5mm²) cables	n/a	10/15A GMT fuse cabling
26 to 22AWG (0.14mm²- 0.34mm²) cables	4	Alarm cabling
UL Listed double-hole lug 1/4in and 5/8in. center-to-center (lug part # Panduit LCD6 -14A-L or equivalent)	2	Ground cable installation

2.2 Install AC/DC Power System Components

The following sections contain instructions for installing components. Figure 2-2 shows a drawing of the Cisco AC/DC Power System without rectifiers.

Figure 2-2 Cisco AC/DC Power System Front View



2.2.1 Install the System Shelf

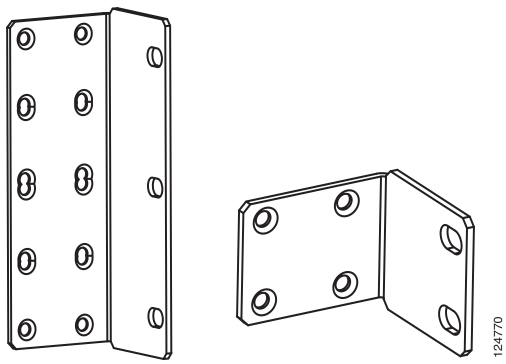
Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

The system shelf should be installed first, followed by the 1 RU Distribution Shelf (if this option is included as part of the installation).

Step 1 Determine if the correct ear mounts are installed on the system shelf. Ear mounts are shipped mounted on the shelf and support 19in. and 23in. IEC and ANSI standards (for 23in. shelves, ears should be removed, reversed and reinstalled). Two additional plates are also included to accommodate ETSI racks (Figure 2-3). To install ETSI mounting ears, remove existing ears and attach ETSI mounting ears using included hardware.

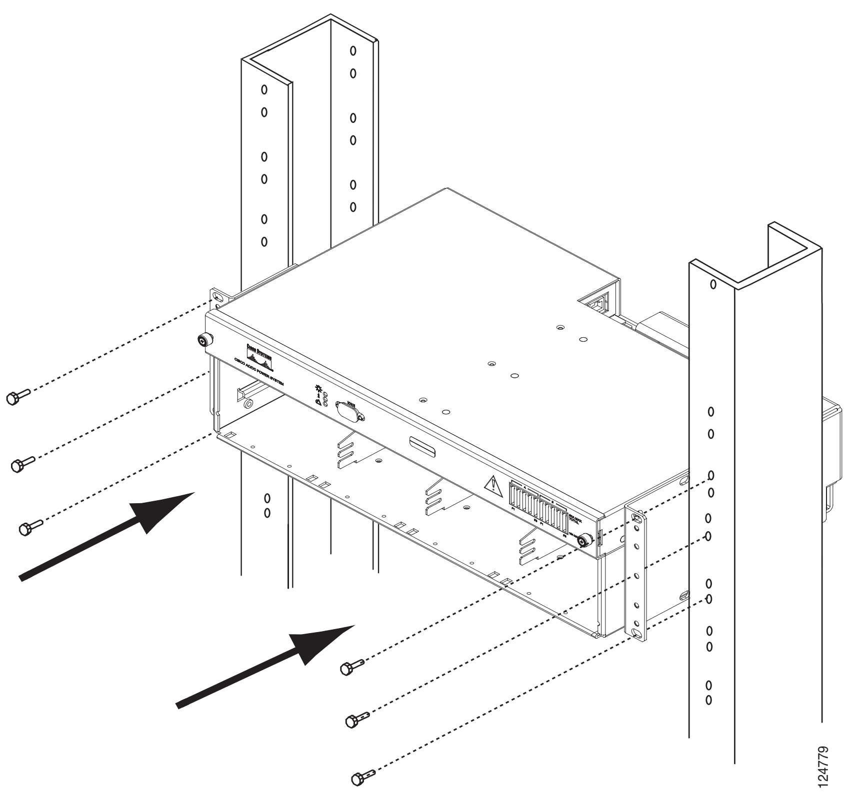
Figure 2-3 ETSI Shelf Ear Mounts (system shelf and 1RU Distribution Shelf)



Step 2 Move the system shelf to the desired rack/cabinet slot (allowing 1RU above the shelf if a 1 RU Distribution shelf will be installed).

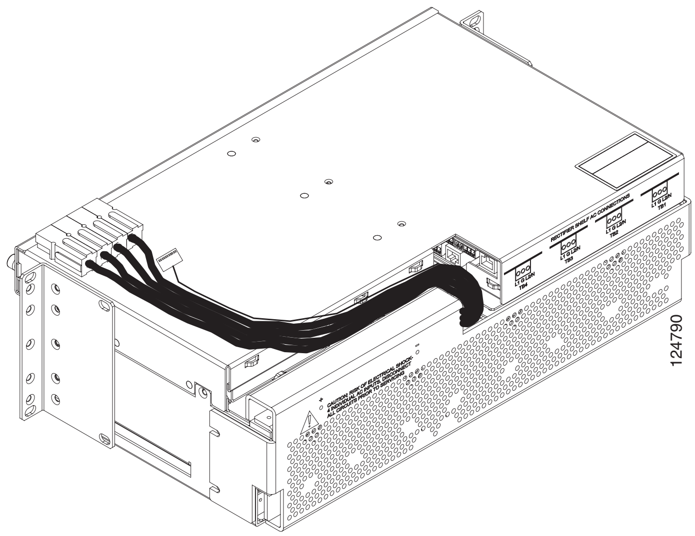
Step 3 Secure the system shelf to the rack using the six included mounting screws (Figure 2-4).

Figure 2-4 Installing the System Shelf



Step 4 Continue with the "2.2.2 Install the 1 RU Distribution Shelf" procedure on page 2-6 if applicable. If this system has no external distribution, place the 4 power connectors and alarm cables on the top of the system shelf to aid in future 1 RU Distribution Shelf installation (Figure 2-5) and continue with the"2.2.3 Install the Ground Cable" section on page 2-9.

Figure 2-5 1 RU Distribution Cable Dressing



2.2.2 Install the 1 RU Distribution Shelf

Systems equipped with an optional 1 RU Distribution Shelf require power connections from the system shelf to the 1 RU Distribution Shelf using four cables terminated with Anderson power pole connectors. These cable connectors are pre-wired to the system shelf and should be connected to the 1 RU Distribution Shelf during installation.

Note In pre-installed system shelves, the DC cabling should be located at the top of the system shelf. Cable labels are provided (-48V and Return) for ease of installation.

In addition, the distribution alarm connection is made via a pre-wired 10 pin Molex™ connector from the system shelf and should be connected to the 1 RU Distribution Shelf at the indicated connection point.

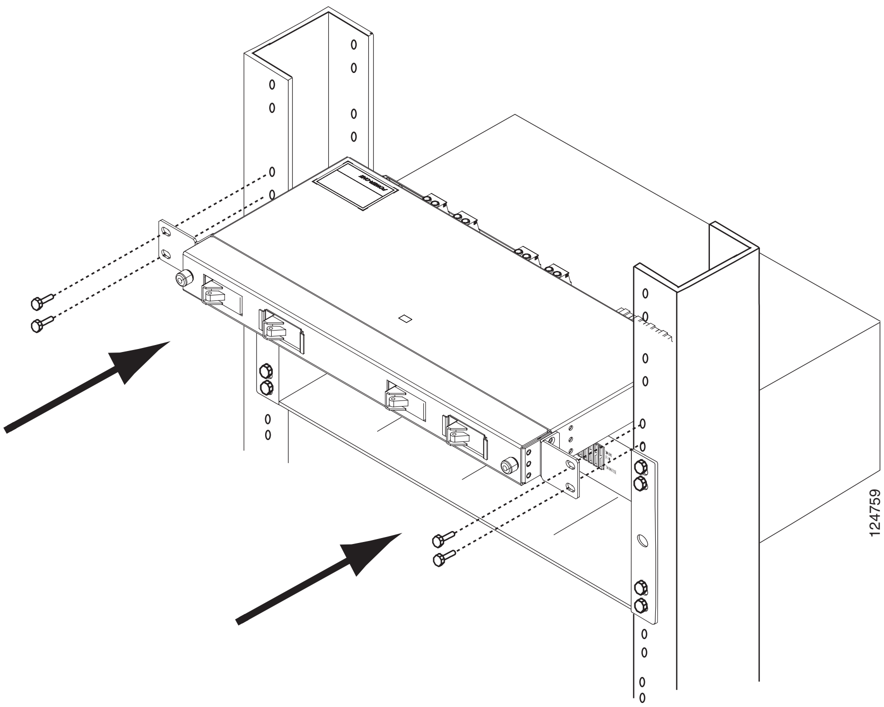
Step 1 Determine if the correct ear mounts are installed on the system shelf. Ear mounts are shipped mounted on the shelf and support 19in. and 23in. IEC and ANSI standards (for 23in. shelves, ears should be removed, reversed, and reinstalled). Two additional plates are also included to accommodate ETSI racks (Figure 2-3 on page 2-5). To install ETSI mounting ears, remove existing ears and attach ETSI mounting ears using included hardware.

Step 2 Make sure that all circuit breakers are in the OFF position (see Figure 2-16 on page 2-19).

Step 3 Move the 1 RU Distribution Shelf to the desired rack slot (directly above the system shelf).

Step 4 Secure the 1 RU Distribution Shelf to the rack using the four included mounting screws (Figure 2-6). See for more information.

Figure 2-6 1 RU Distribution Shelf Installation



2.2.2.1 Install the Communications Cabling (Optional)

If the power system is equipped with the 1 RU Distribution Shelf, follow the instructions below. For power systems without the 1 RU Distribution Shelf, skip this procedure and go to the "2.2.3 Install the Ground Cable" procedure on page 2-9.

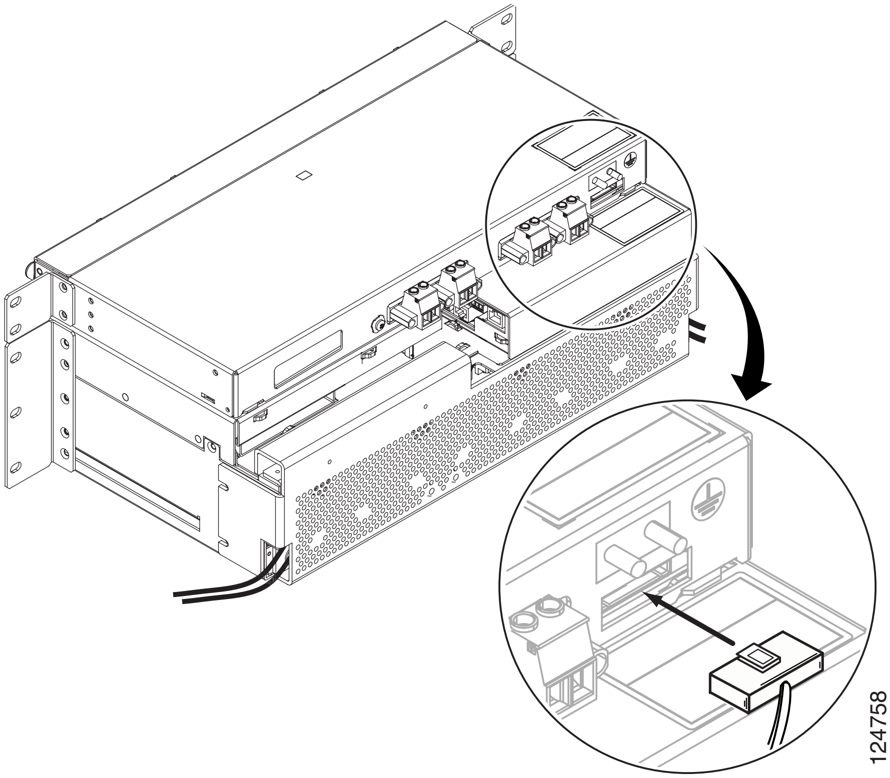
Intra-system shelf communication is accomplished using a 10 pin Molex™ connector originating from the system shelf and connecting to the 1 RU Distribution Shelf. Use the following instructions to install the communications cabling:

Step 1 Locate the distribution alarm cable at the rear of the system shelf.

Step 2 This cable is a prewired 10 pin Molex™ connector and is installed into the 1RU at the indicated location (Figure 2-7).

Note The Molex™ alarm connector is keyed and can only be inserted one way. If the connector does not insert easily into the mount, make certain that the connector is being inserted with the key side up.

Figure 2-7 1 RU Distribution Shelf Alarm Cabling



2.2.2.2 Install the DC Power Cabling (Optional)

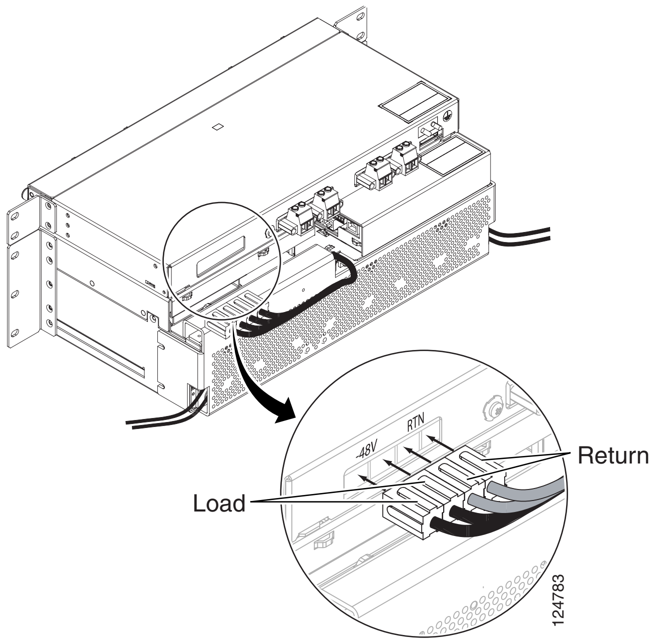
If the system is equipped with the 1 RU Distribution Shelf, follow the instructions below. For systems without the 1 RU Distribution Shelf, skip this procedure and go to the "2.2.3 Install the Ground Cable" procedure on page 2-9.

Step 1 Locate the four 6AWG (16mm²) power cables provided at the rear of the system shelf (on top of the system shelf in preinstalled systems). These are terminated with Anderson Powerpole™ Connectors (to install these connectors, remove the heat shrink from the ends of the connector).

Step 2 Connect to the appropriate connection points on the 1RU Distribution Shelf labeled load (-48V) and return (RETURN) (Figure 2-8).

Note Anderson Powerpole™ Connectors are keyed and can only be inserted one way. If the connector does not insert easily into the mount, make certain that the connector is being inserted with the key side up.

Figure 2-8 Installing 1 RU DC Cabling



2.2.3 Install the Ground Cable

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

The equipment rack/cabinet, system, and optional distribution shelf need to be properly grounded to ensure the safe and efficient operation of the Cisco AC/DC Power System. Refer to NEC, CEC, ANSI T1-333, ETSI 300-386-TC, and local codes for guidelines on bonding telecom DC power equipment to building ground.

The system shelf should be connected to the rack/cabinet frame by a UL-listed 6 AWG (16mm²) wire with an insulation rating of at least 75° Celsius. Two #10 studs are provided at the rear of the shelf. The connection at the shelf end is made using a UL-listed double-hole lug 1/4in and 5/8in. center-to-center (lug part # Panduit LCD6-14A-L or equivalent).

The optional 1 RU Distribution Shelf should be bonded to the frame by a UL-listed 6 AWG (16mm²) wire with an insulation rating of at least 75° Celsius. Two #10 studs are provided at the rear of the shelf for this purpose. The connection at the shelf end is made using a UL-listed double-hole lug 1/4in. and 5/8in. center-to-center (lug part # Panduit LCD6-14A-L or equivalent).

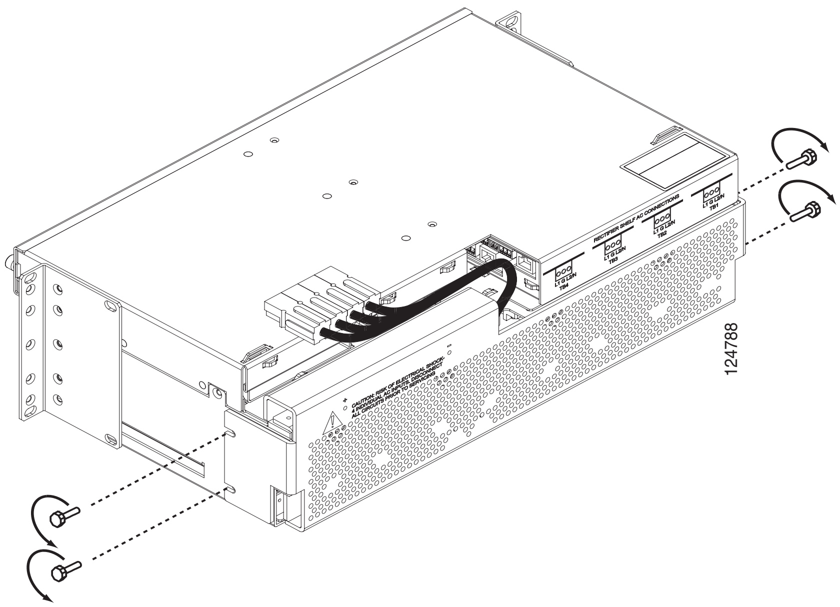
2.2.3.1 Install the Cabinet/Rack Ground

The equipment rack should be bonded to the building principal ground busbar. Refer to the NEC, CEC, ANSI T1-333, ETSI 300-386-TC, and local codes for guidelines on bonding telecom DC power equipment to the building ground.

2.2.3.2 Install the System Shelf Ground

Step 1 Loosen the cover from the rear of the system shelf by loosening the four screws (Figure 2-9).

Figure 2-9 Removing the System Shelf Rear Cover

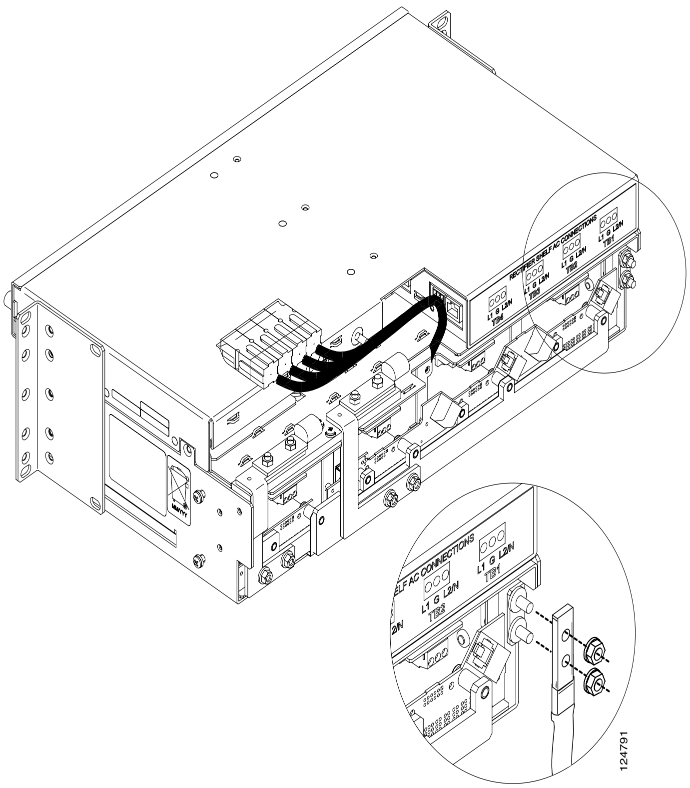


Step 2 Pull out from the bottom and lift up to remove.

Step 3 Locate the #10 studs at the rear of the system shelf (Figure 2-10).

Step 4 Using a UL-listed 6 AWG (16mm²) wire with an insulation rated to at least 75°C, connect the shelf to the appropriate cabinet connection point. The connection at the shelf end is made using a UL-listed double-hole lug 1/4in and 5/8in. center-to-center (lug part # Panduit LCD6-14A-L or equivalent) (Figure 2-10).

Figure 2-10 Installing the System Shelf Ground



Step 5 Determine if the system is equipped with the optional 1 RU Distribution Shelf; if so, continue with the "2.2.3.3 Install the 1 RU Distribution Shelf Ground" section on page 2-11. If not continue with the "2.3 Install AC Power Cables" section on page 2-12.

2.2.3.3 Install the 1 RU Distribution Shelf Ground

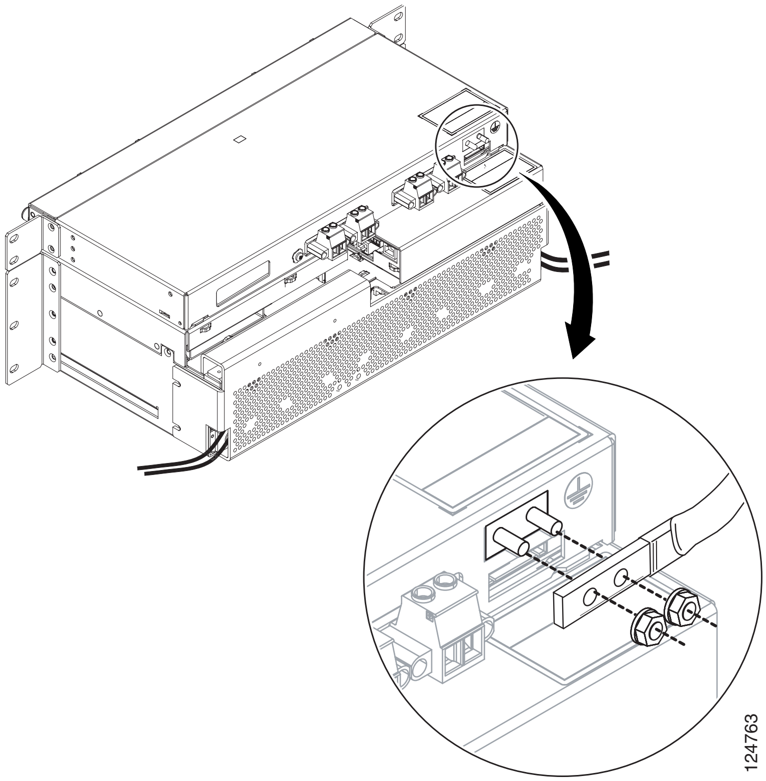
Step 1 Locate the #10 studs at the rear of the 1 RU Distribution Shelf.

Step 2 Using a UL-listed 6 AWG (16mm²) wire with an insulation rating of at least 75° C, connect the 1 RU Distribution Shelf to the appropriate cabinet connection point.

Step 3 The connection at the shelf end is made using a UL-listed double-hole lug 1/4in and 5/8in. center-to-center (lug part # Panduit LCD6-14A-L or equivalent) (Figure 2-11).

Step 4 To accommodate future upgrades, leave a service loop (1.5ft [60cm]) at the side of the shelf.

Figure 2-11 Installing the 1 RU Distribution Shelf Ground



2.3 Install AC Power Cables

Each rectifier in the system shelf is individually powered through a 110/230 V AC single phase 15A circuit and draws a maximum of 9.1A.

Each rectifier position in the shelf can be powered by either:

- 208/220/240V AC split phase
- 230V single phase
- 110V single phase
- Max current per position (9.1A)

Note Rectifier output capacity at 110 VAC is reduced to less than half of the maximum output.

- Locate the power shut-off switch for the installation area
- Install the system using the following electrical codes:
  - United States National Electrical Code (NEC)
  - Canadian Electrical Code (CEC)

- International Electromechanical Commission (IEC)
- Any local or site specific codes
- EN60950

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

- Never install damaged or malfunctioning equipment.

To install AC power to the Cisco AC/DC Power System:

Step 1 Ensure that input circuit breakers or fuses are off or removed and the cable is not connected to the outlet.

Step 2 To aid in future expansion, all AC cable positions should be connected to the rear of the shelf during installation.

Step 3 The system shelf is supplied with four AC cables. Each AC cable provides power to individual rectifier positions. The cable is terminated to allow for local plug requirements.

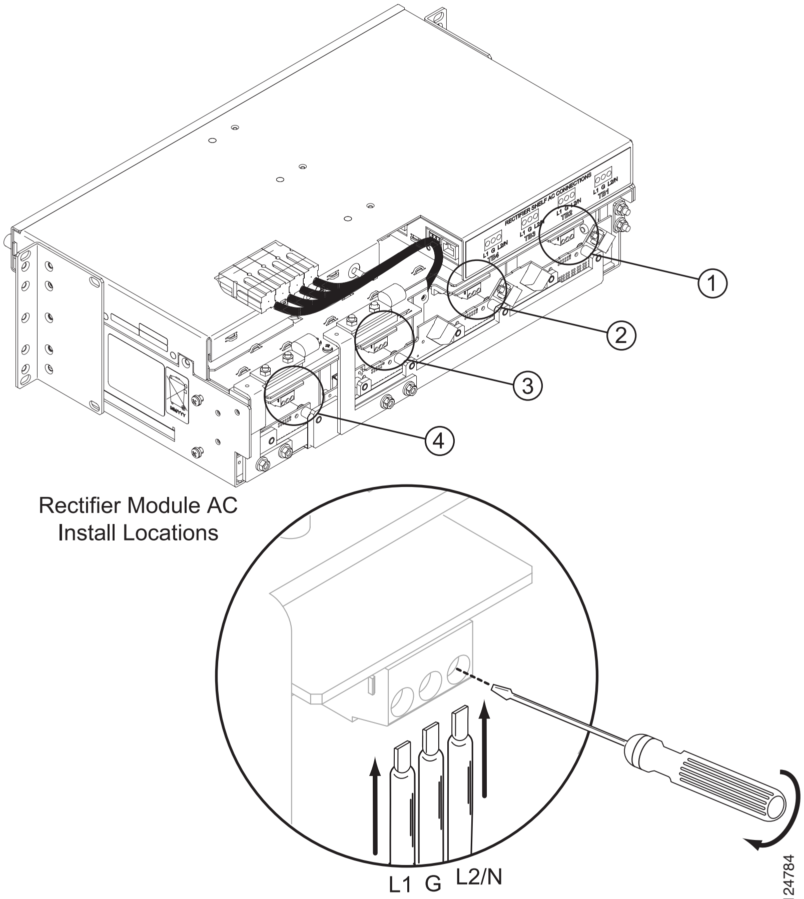
Note A 15A circuit (for both 110 and 208V AC) should be used based on maximum AC input per rectifier (9.1A).

Step 4 The rear system shelf cover should already be removed, if not, remove it.

Step 5 Locate the cables at the rear of the system shelf.

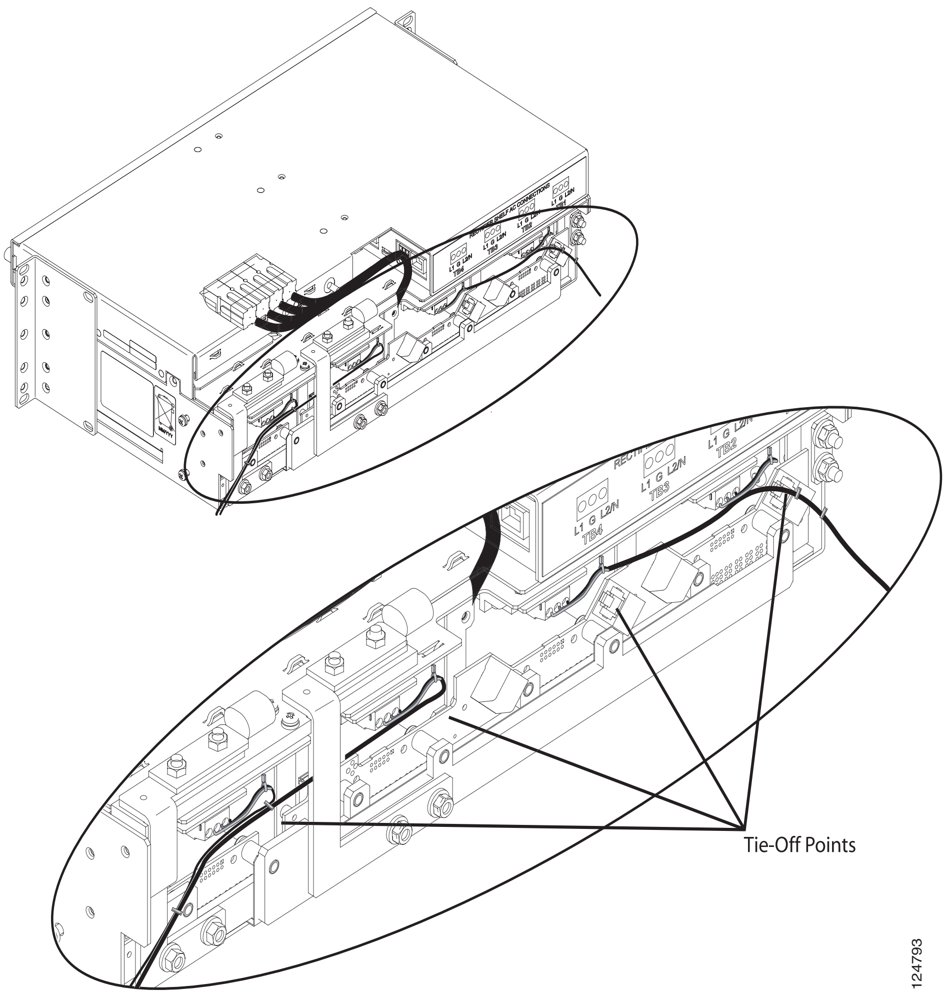
Step 6 Attach the ferrule end of the cables (Ground (G), L1, and L2 (neutral) to the system shelf AC receptacle by inserting (the ferrule will only fit in one direction) and tightening with a flat screwdriver (Figure 2-12).

Figure 2-12 Installing the AC Cable Shelf



Step 7 After attaching the AC cables, route the cables at the rear of the shelf using the supplied tie-offs to secure the cables and exit at the sides of the shelf (Figure 2-13).

Figure 2-13 Routing AC Cables



Step 8 AC cabling is routed through either side of the system shelf and secured using tie off points.

Step 9 AC cabling should be tied off inside the cabinet/rack.

Step 10 Repeat for all AC cables.

Step 11 Connect the terminated AC plug to the AC receptacle at the install location.

Note A separate AC receptacle is required for each AC cable, and each receptacle should be on its own circuit breaker to maximize protection against AC circuit breaker failure.

Table 2-4 Individual AC Feed Specifications

Shelf Size	Rectifier Positions	AC Input (Fuse or Breaker) 110/208 VAC Single Phase	Minimum AC Wire Gauge UL Style SOOW
19 inch	1	15A	14 AWG ($2.5mm^2$) 3 conductor
19 inch	2	15A	14 AWG ($2.5mm^2$) 3 conductor
19 inch	3	15A	14 AWG ($2.5mm^2$) 3 conductor
19 inch	4	15A	14 AWG ($2.5mm^2$) 3 conductor

2.3.1 Install the Rectifiers

To install the rectifiers in the Cisco AC/DC Power System:

Step 1 Locate the first (left-most when viewed from the front) rectifier install location.

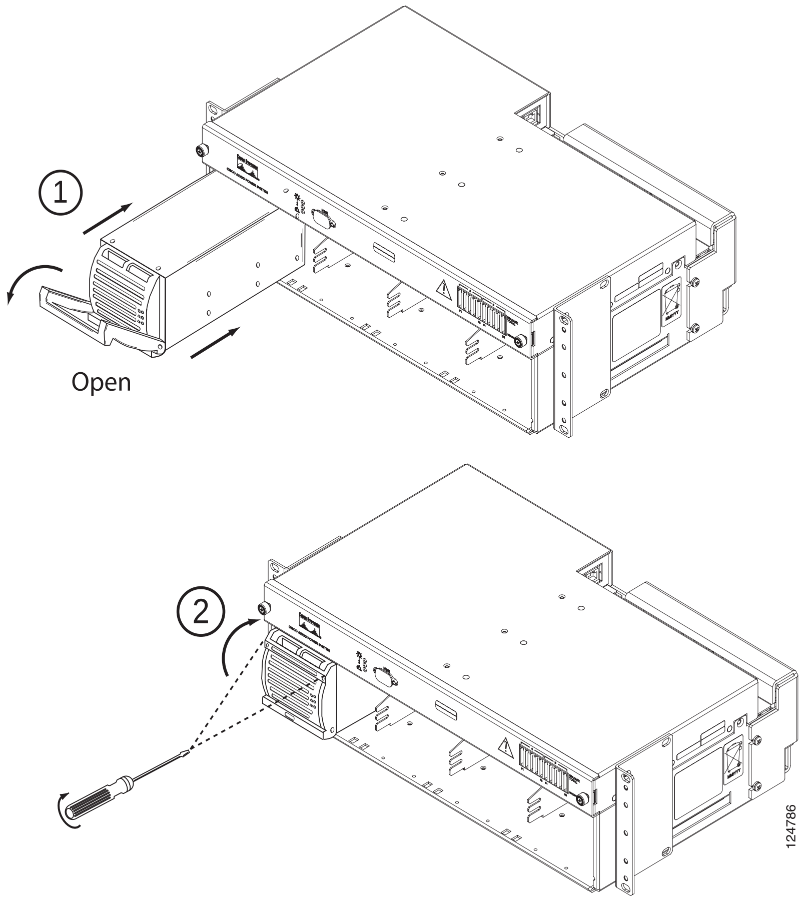
Step 2 Make sure that the rectifier handle is in the OPEN position (handle pulled away from the rectifier body).

Step 3 Place the module in front of the correct mounting slot on the shelf with the handle facing out (Figure 2-14 #1).

Step 4 Slide the module until it contacts the interface connection at the rear of the shelf.

Step 5 Fully insert the rectifier by pushing the module handle towards the shelf; the handle will rise up and lock the module into place (Figure 2-14 #2).

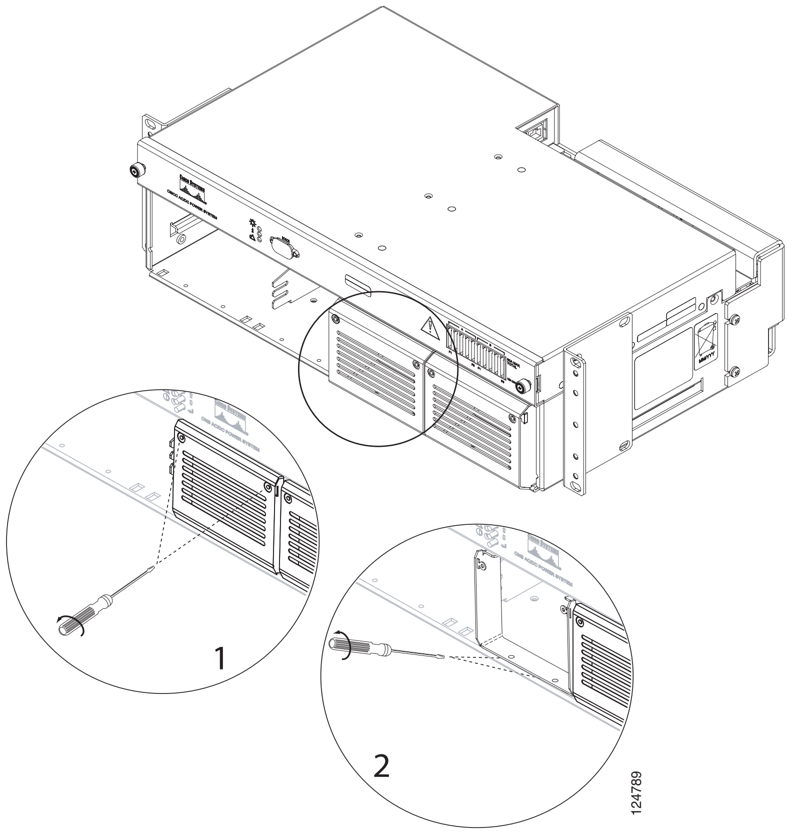
Figure 2-14 Installing a Rectifier



Step 6 Tighten the handle-mounted common screws into the rectifier to ensure a firm connection (Figure 2-14 #2).

Step 7 Repeat this procedure for any additional modules (two total for small systems, three for medium systems, and four for large systems. Some systems may require removing blank rectifier faceplates. To do this, remove the two Phillips screws from the blank rectifier faceplate (Figure 2-15 #1). Remove the blank rectifier faceplate mounting bracket by removing the two Phillips screws (Figure 2-15 #2).

Figure 2-15 Removing a Rectifier Blank Faceplate



Step 8 Install additional rectifiers using the instructions in Steps 2 through 5.

For more information on installing rectifiers in a powered system, see the "4.2.2.2 Add Modules" section on page 4-2.

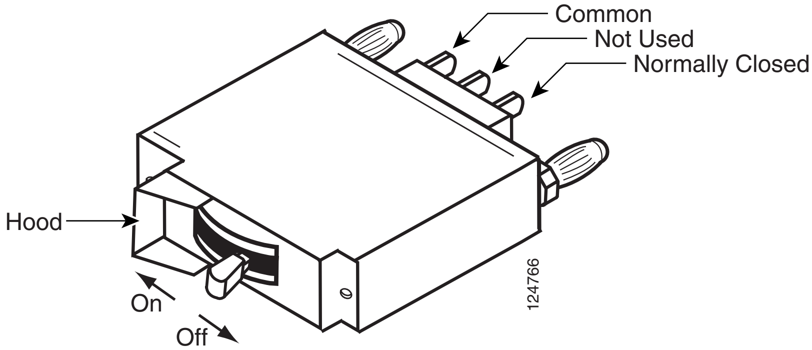
2.4 Install Circuit Breakers

Note This procedure is optional for large systems.

Large systems equipped with the 1 RU Distribution Shelf require the installation of circuit breakers to ensure proper system protection (the 1 RU Distribution Shelf is shipped with circuit breakers installed for use in medium systems). To install circuit breakers in a large system:

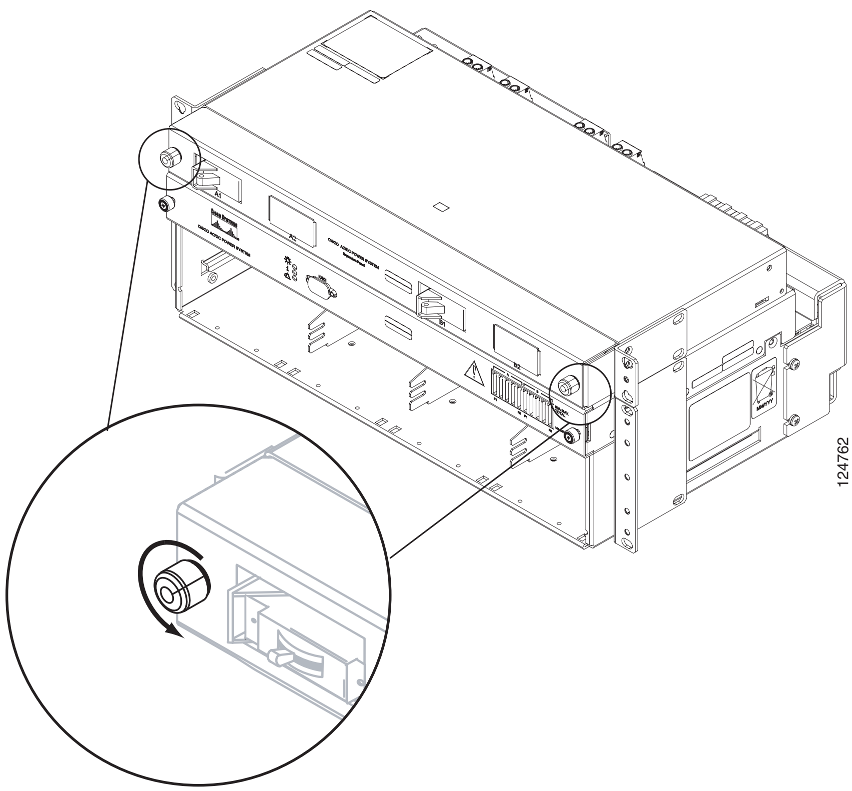
Step 1 Make certain all breakers to be installed are in the OFF position (Figure 2-16).

Figure 2-16 Circuit Breaker On/Off Positions



Step 2 Remove the 1 RU Distribution Shelf faceplate by loosening the two thumbscrews on the shelf faceplate (Figure 2-17).

Figure 2-17 Removing the 1 RU Distribution Shelf Faceplate



Step 3 Locate the circuit breaker installation locations inside the 1 RU Distribution Shelf (positions A1, A2, B1, and B2) (see Table 2-5 on page 2-20). Circuit breakers should be installed with the protective hood (covering the ON position) on the left side of the shelf (Figure 2-16) to allow the 1 RU Distribution Shelf faceplate to be correctly installed.

Step 4 Attach the circuit breaker alarm cables to the rear of the circuit breaker; the alarm cables are labeled C (Common) and NC (Normally Closed) and are attached to the positions shown in Figure 2-16.

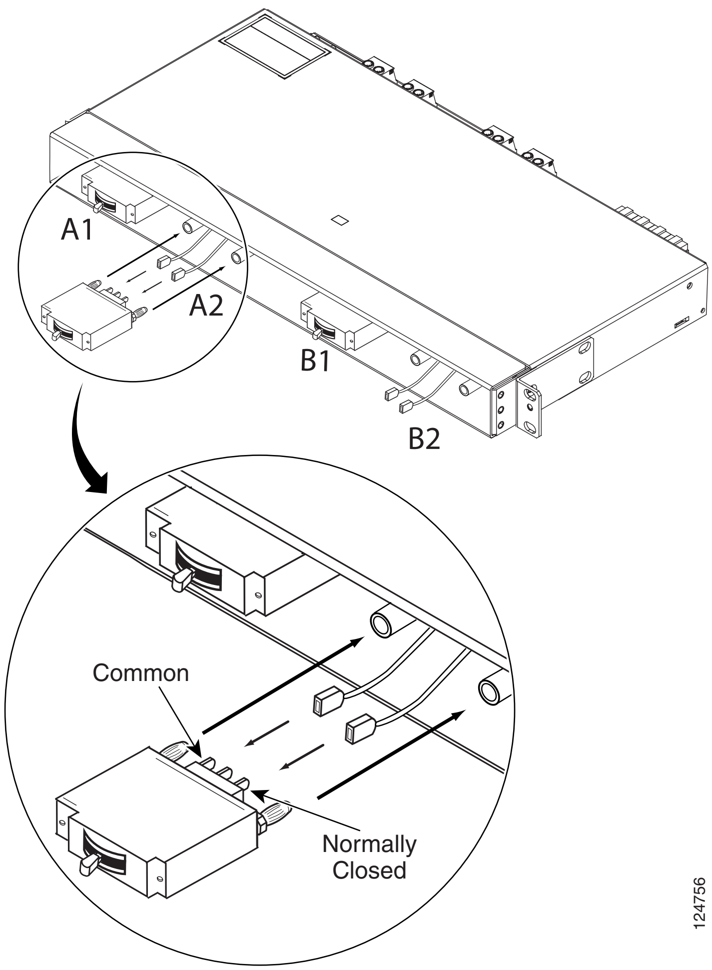
Table 2-5 Circuit Breaker Positions

System Size	A1	A2	B1	B2
Small	n/a	n/a	n/a	n/a
Medium	X	[1]	x	[2]
Large	X	X	X	X

1. Future Upgrade
2. Future Upgrade

Step 5 Gently glide the breaker so that the quick disconnect plugs are aligned with the mounting holes (Figure 2-18).

Figure 2-18 Installing a Circuit Breaker



Step 6 Push the breaker until the quick disconnect plugs are firmly seated in the mounting holes.

Step 7 Repeat for additional breaker.

Step 8 Replace the 1 RU Distribution Shelf faceplate and tighten the thumbscrews.

2.4.1 Install the Alarm Cable

The following explains how to install alarm communication cabling to the Cisco AC/DC Power System Controller.

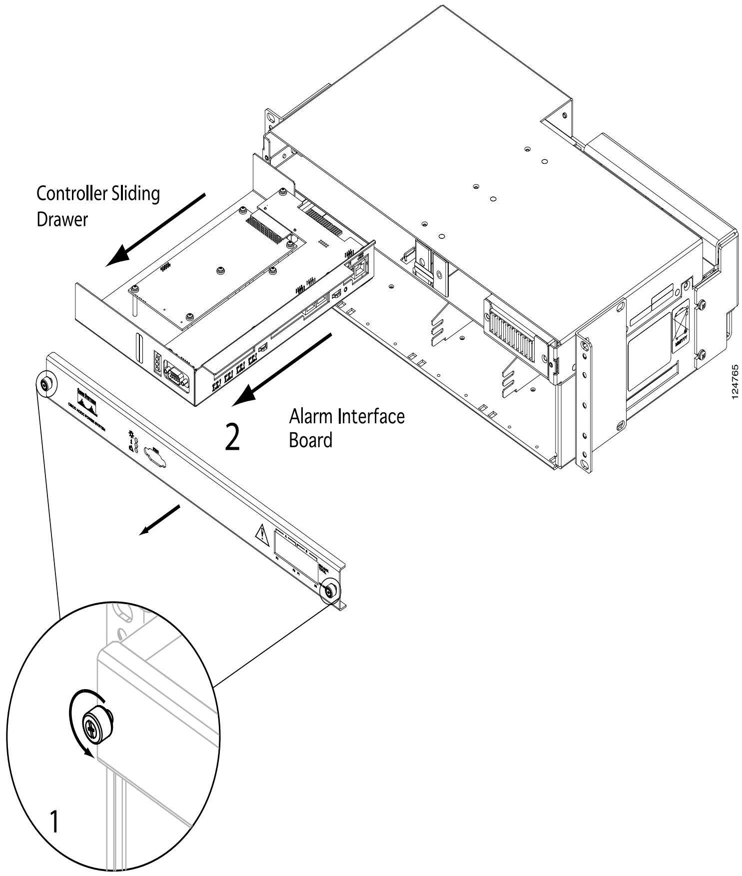
Warning **Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards.** Statement 1033

Note Alarm cables run from the rear right of the shelf through the power shelf (Figure 2-20) to the front alarm interface board connectors; remove the controller faceplate and slide the controller tray forward to access the alarm interface board.

To install alarm cabling to the Cisco AC/DC Power System:

Step 1 Remove the system shelf faceplate (by loosening the two front thumbscrews) to access the controller sliding drawer (Figure 2-19).

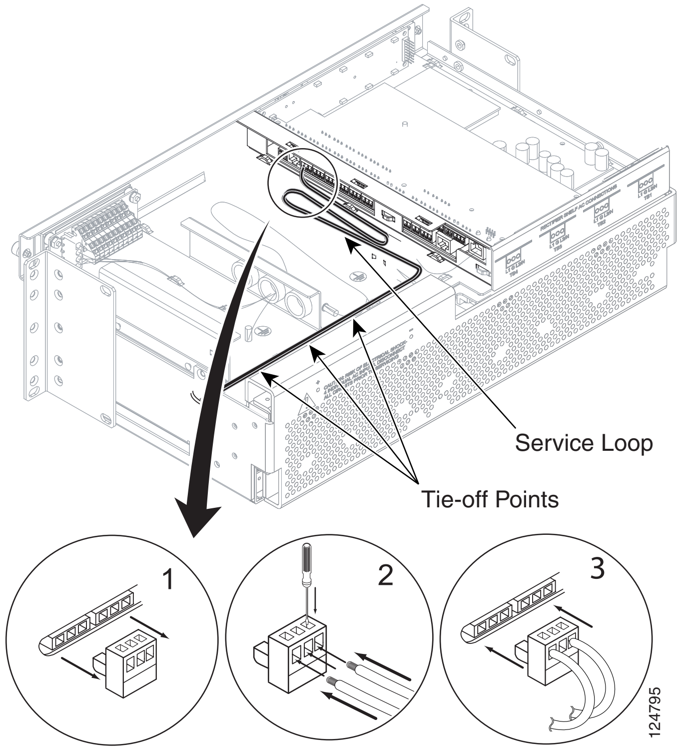
Figure 2-19 Removing the Controller Faceplate



Step 2 Slide the drawer out and away from the system shelf to access the alarm interface board.

Step 3 The terminal block may be removed to make alarm cable connections (Figure 2-20).

Figure 2-20 Installing an Alarm Cable



Step 4 Alarm contacts labeled 1 through 4, NO, C, and NC refer to the OFF state of the power system and alarmed condition (Table 2-6).

Table 2-6 Alarm and Jumper Designations

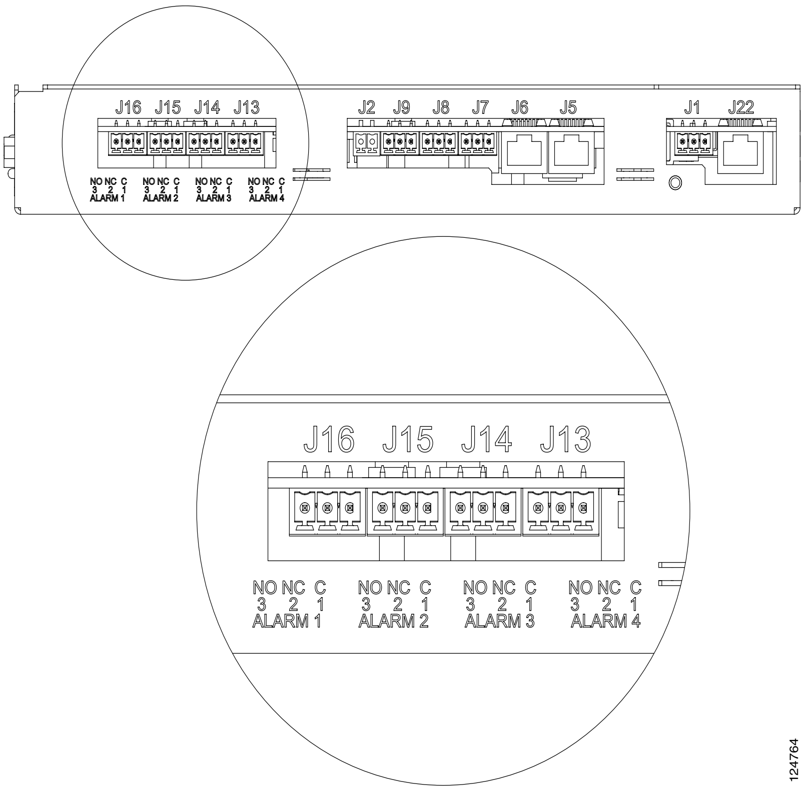
Jumper (System with LCD)	Jumper (System without LCD)	Alarm Designation	1	2	3	4
J16 (1-3)	J16 (1-3)	Low Voltage	X			
J15 (1-3)	J15 (1-3)	Mains Error		X		
J14 (1-3)	J14 (1-3)	Module Failure			X	
J14 (4-6)	J13 (1-3)	Fuse/Circuit Breaker Failure				X

Note Either NO or NC can be used for alarming. Figure 2-20 depicts the NC connection in the 1 and 3 positions on the connectors.

Step 5 The terminal blocks (green) will accept 26AWG (0.14mm²) to 22AWG (0.34mm²) cables. Remove the terminal block (Figure 2-20 #1).

Step 6 Insert the stripped alarm cables and tighten using a flat screwdriver (Figure 2-20 #2). Refer to Figure 2-21 (Version 2 of the controller) and Figure 3-4 on page 3-5 (Version 1 of the controller) for information on alarm connection locations.

Figure 2-21 Alarm Board Connection Points



Step 7 Reinsert the terminal block (Figure 2-20 #3).

Step 8 Alarm cables run from the rear of the system shelf (leaving enough of a service loop to allow the drawer to slide out) through the access window (between the controller drawer and the GMT drawer area) (Figure 2-20).

Step 9 Secure the alarm cables using the provided strain relief tie-offs to aid in cable management.

2.5 Install Load-and-Return Connections

The following section contains information on installing different distribution options available for the power system. Table 2-7 provides a list of recommended wire gauges for both the GMT fuse panel and the 1 RU Distribution Shelf.

Table 2-7 Recommended Wire Sizes

Wire Gauge Stranded	Applications
10 to 8 AWG (6mm² to 10mm²)	Breaker Load (up to 30A)
22 AWG (0.34mm²)	2A GMT Fuses
18 AWG (0.75mm²)	5A GMT Fuses

Table 2-7 Recommended Wire Sizes (continued)

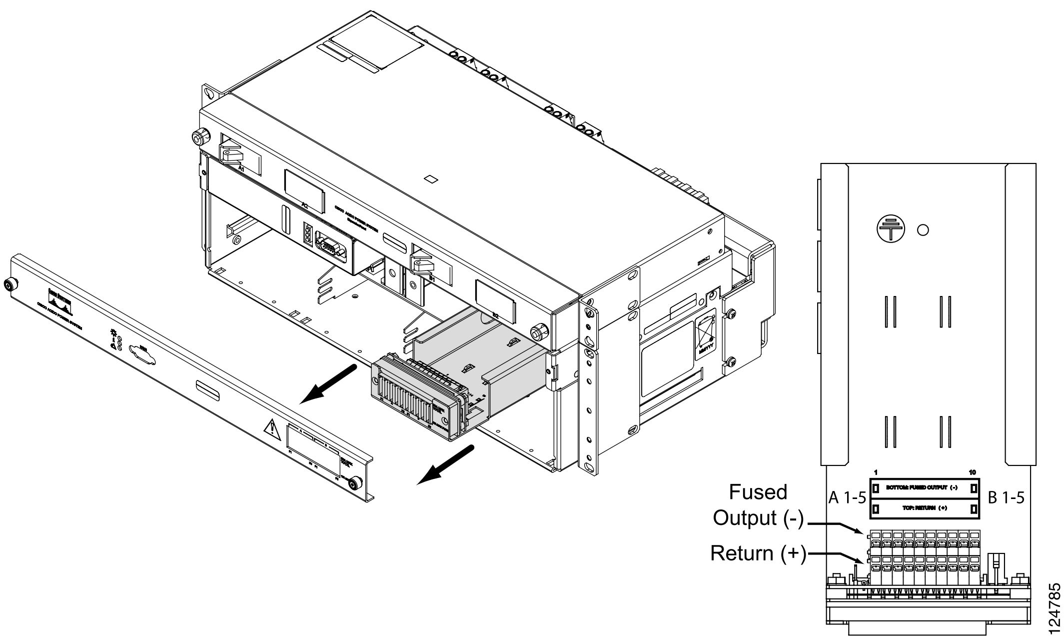
Wire Gauge Stranded	Applications
14 AWG ($2.5mm^2$)	10A GMT Fuses
14 AWG ($2.5mm^2$)	15A GMT Fuses

2.5.1 Install GMT Fuse Connections

Load connections to the GMT fuse panel are made using spring loaded terminals that do not require the use of connection lugs.

Step 1 Locate the GMT fuse connections by removing the controller faceplate (Figure 2-19) and sliding the GMT drawer out (Figure 2-22).

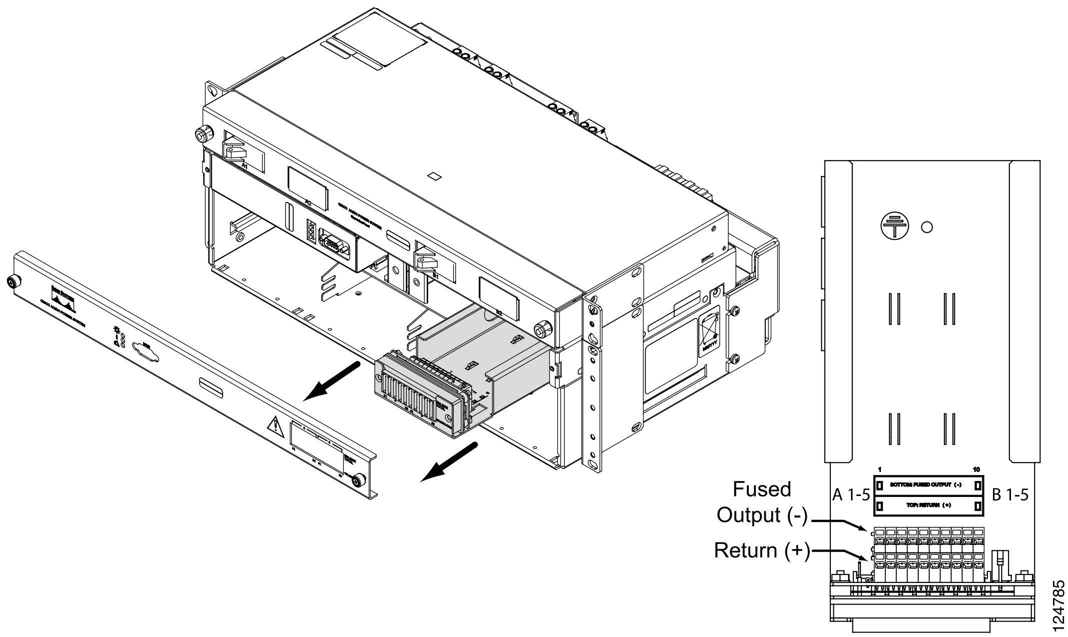
Figure 2-22 GMT Drawer



Step 2 Route the GMT load-and-return cabling from the rear of the system shelf (leaving enough of a service loop to allow the drawer to slide out) through the fuse panel channel and secure using the supplied tie-downs.

Step 3 Connect the wires to the appropriate terminal by using a flat screwdriver to open the terminal (Figure 2-23) and inserting the appropriate cable into the spring-loaded terminals. Terminals correspond to fuses: Side A (1-5) and Side B (1-5) from left to right (viewed from the front of the system).

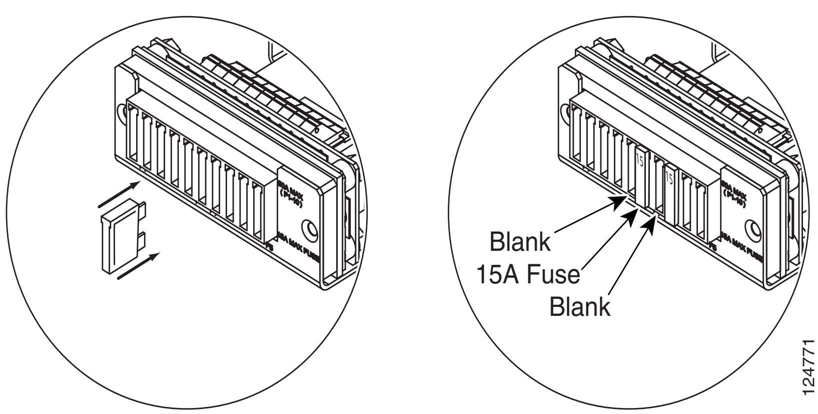
Figure 2-23 Installing GMT Cabling



Step 4 Connect cables to equipment that requires the supplied DC Power per that equipment's specifications.

Step 5 Install fuses by sliding them into the appropriate slot (Figure 2-24).

Figure 2-24 Installing Fuses



Note An empty space should be left on each side of any 15A GMT fuse used for thermal considerations.

2.5.2 Install 1 RU Distribution Shelf Load Connections

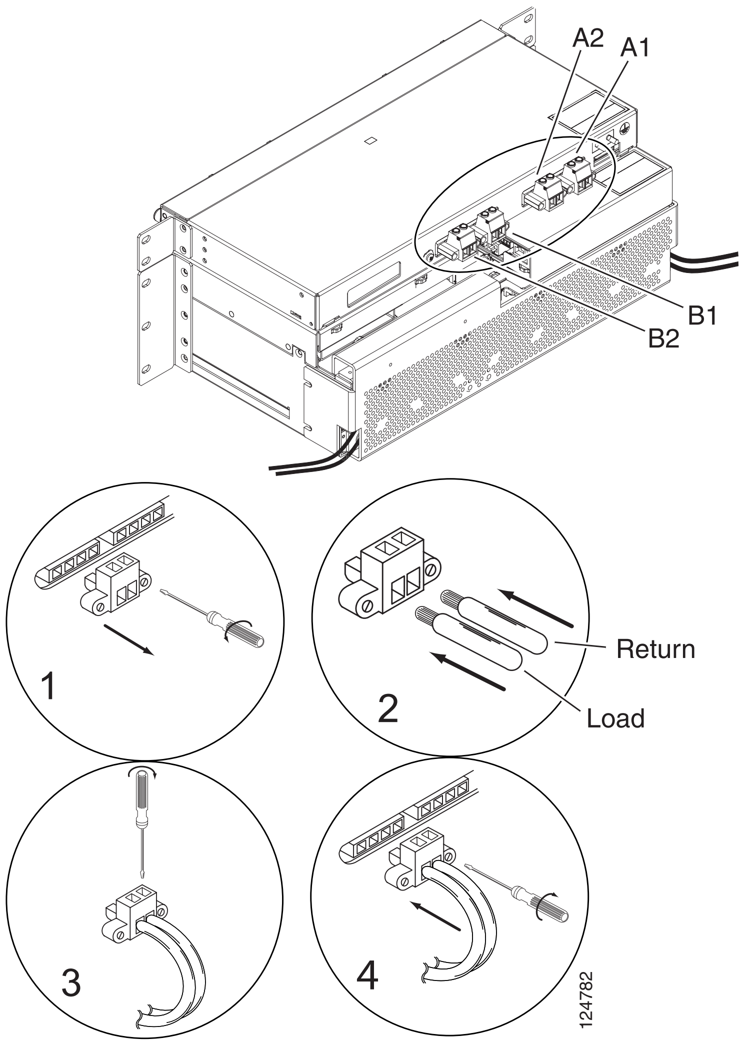
The following section is for systems that use the 1 RU Distribution Shelf. For systems without the 1 RU Distribution Shelf, go to Chapter 4, "System Operation."

Step 1 Select the wire gauge for the application. See Table 2-7 on page 2-24 for wiring information.

Step 2 Locate the load-and-return connections at the rear of the 1 RU Distribution Shelf (Figure 2-25).

Step 3 Remove the Phoenix Contact PC6™ connectors from the 1 RU Distribution Shelf by loosening the flat screws and pulling the connectors away from the 1 RU Distribution Shelf (Figure 2-25 #1).

Figure 2-25 Installing Load Connections



Step 4 Connect the wires to the appropriate terminal for the load-and-return connections by inserting and then tightening the connector (Phoenix Contact PC6™ connectors) (Figure 2-25 #2, #3). Allow enough of a service loop to allow for the removal of the 1 RU Distribution Shelf.

Step 5 Reinstall the Phoenix Contact PC6™ connector to the 1 RU Distribution Shelf (Figure 2-25 #3).

Step 6 Reconnect to the 1RU Distribution Shelf (Figure 2-25 #4).

Step 7 Connect the load-and-return cables to the equipment that requires the supplied DC Power per that equipment's specifications.

Step 8 Repeat for additional DC cabling.

2.6 System Upgrades

If the installation is an upgrade of a pre-existing system, the following sections give a list of the procedures needed to upgrade the system:

- 2.6.1 GMT Fuses, page 2-28
- 2.6.2 Small to Medium System Upgrade, page 2-28
- 2.6.3 Medium to Large System Upgrade, page 2-29
- 2.6.4 Small to Large System Upgrade, page 2-29

Review the following sections before attempting a system upgrade:

- 2.1.1 Ground Symbol, page 2-1
- 2.1.2 Tools Required, page 2-1
- 2.1.4 Installation Materials, page 2-2

Note Some upgrade connections may require access to the rear of the system. If rear access is not available, all rear connections are required to have a service loop that allows the 1 RU Distribution Shelf to be pulled out (after unscrewing the cabinet/mounting screws) to allow for access. For information on removing the 1 RU Distribution Shelf see 3.2.1 Replace the 1 RU Distribution Shelf, page 3-1.

2.6.1 GMT Fuses

To add fuses to the GMT fuse block, see the "2.5.1 Install GMT Fuse Connections" procedure on page 2-25.

2.6.2 Small to Medium System Upgrade

To upgrade a small system (2 rectifiers, no 1 RU Distribution Shelf) to a medium system (3 rectifiers, 1 RU Distribution Shelf with 2 circuit breakers), use the following sections:

- 2.2.2 Install the 1 RU Distribution Shelf, page 2-6
- 2.2.2.1 Install the Communications Cabling (Optional), page 2-7
- 2.2.2.2 Install the DC Power Cabling (Optional), page 2-8
- 2.2.3.3 Install the 1 RU Distribution Shelf Ground, page 2-11
- 2.3.1 Install the Rectifiers, page 2-16
- 2.5.2 Install 1 RU Distribution Shelf Load Connections, page 2-26

2.6.3 Medium to Large System Upgrade

To upgrade a medium system (3 rectifiers, 1 RU Distribution Shelf with 2 circuit breakers) to a large system (4 rectifiers, 1 RU Distribution Shelf with 4 circuit breakers), use the following sections:

- 2.3.1 Install the Rectifiers, page 2-16
- 2.4 Install Circuit Breakers, page 2-18
- 2.5.2 Install 1 RU Distribution Shelf Load Connections, page 2-26

2.6.4 Small to Large System Upgrade

To upgrade a small system (2 rectifiers, no 1 RU Distribution Shelf) to a large system (4 rectifiers, 1 RU Distribution Shelf with 4 circuit breakers), use the following sections:

- All of the steps for upgrading from the "2.6.2 Small to Medium System Upgrade" section on page 2-28
- All of the steps for upgrading from the "2.6.3 Medium to Large System Upgrade" section on page 2-29



Component Replacement

This chapter contains information about replacing Cisco AC/DC Power System components in the field. Consult this chapter in the event of a system malfunction.

3.1 Safety

The following warning should be followed to ensure personal safety and to protect the Cisco AC/DC Power System:

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

The following guideline should be followed to ensure personal safety and to protect the Cisco AC/DC Power System:

Keep the system area clear and dust-free during and after the installation.

See the "1.2 Safety Recommendations" section on page 1-8 for more warnings.

3.2 Component Replacement

The following section contains information about replacing components in the Cisco AC/DC Power System.

3.2.1 Replace the 1 RU Distribution Shelf

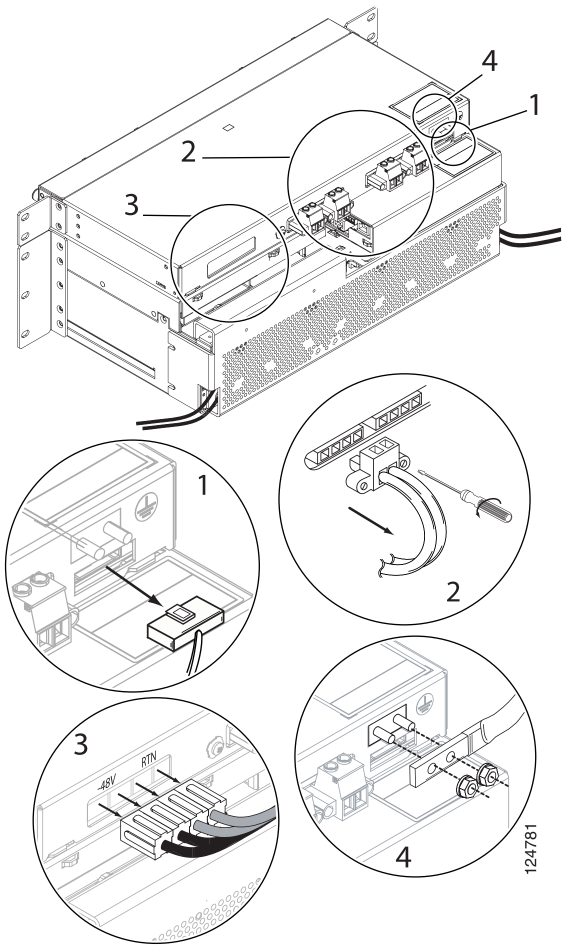
Step 1 Locate the 1 RU Distribution Shelf installation location.

Step 2 Ensure that all the circuit breakers are in the OFF position.

Step 3 Ensure that equipment being powered by the Cisco AC/DC Power System is OFF and not drawing DC power.

Step 4 Locate the load-and-return connections at the rear of the 1 RU Distribution Shelf. Remove the Phoenix Contact PC6™ connectors from the 1 RU Distribution Shelf by loosening the flat screws and pulling the connectors away from the 1 RU Distribution Shelf (Figure 3-1 #2).

Figure 3-1 Removing the 1 RU DC Cable



Step 5 Locate the distribution alarm cable at the rear of the 1RU DC Distribution Shelf.

Step 6 Remove the 10 pin Molex™ alarm cable by squeezing the top and pulling the cable away from the shelf (Figure 3-1 #1).

Step 7 Locate the four 6AWG (16mm²) power cables provided at the rear of the 1RU Distribution Shelf.

Step 8 Remove the power cables by pulling them out and away from the 1RU Distribution Shelf (Figure 3-1 #3).

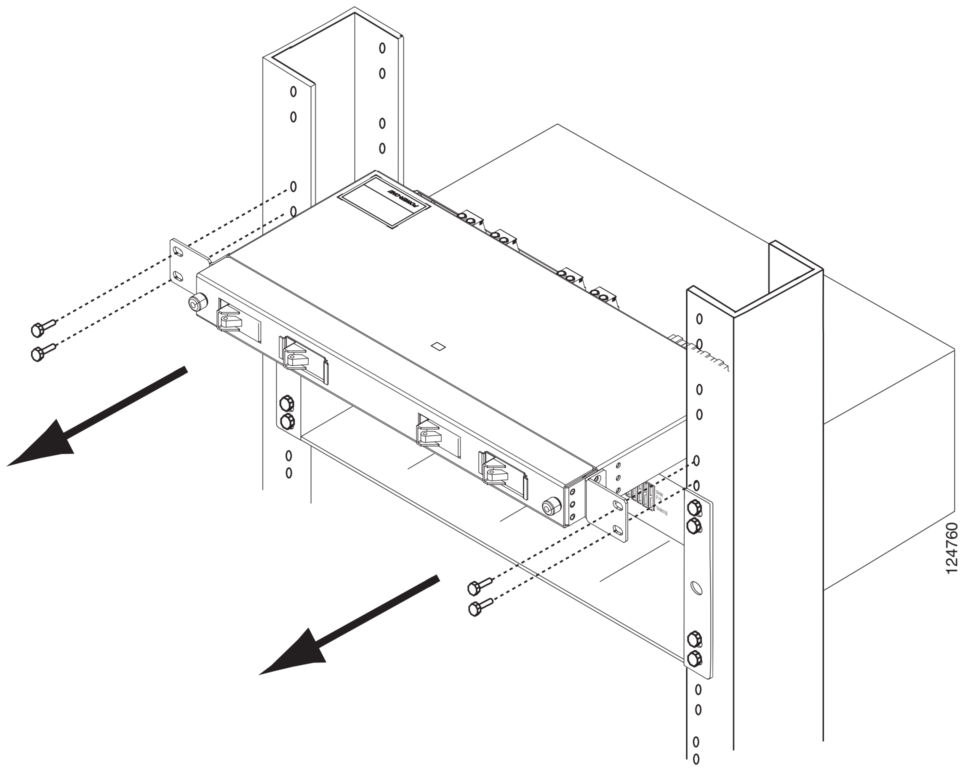
Note Cover the connectors to insulate the live current on the lugs.

Step 9 Locate the ground cable attached to the #10 studs at the rear of the 1RU Distribution Shelf.

Step 10 Using an 8mm socket or wrench remove the nuts and the ground cable (Figure 3-1 #4).

Step 11 Remove the four screws that mount the shelf to the cabinet/rack (Figure 3-2).

Figure 3-2 Removing the 1 RU Distribution Shelf



Step 12 Slide the 1RU Distribution Shelf away from the cabinet/rack.

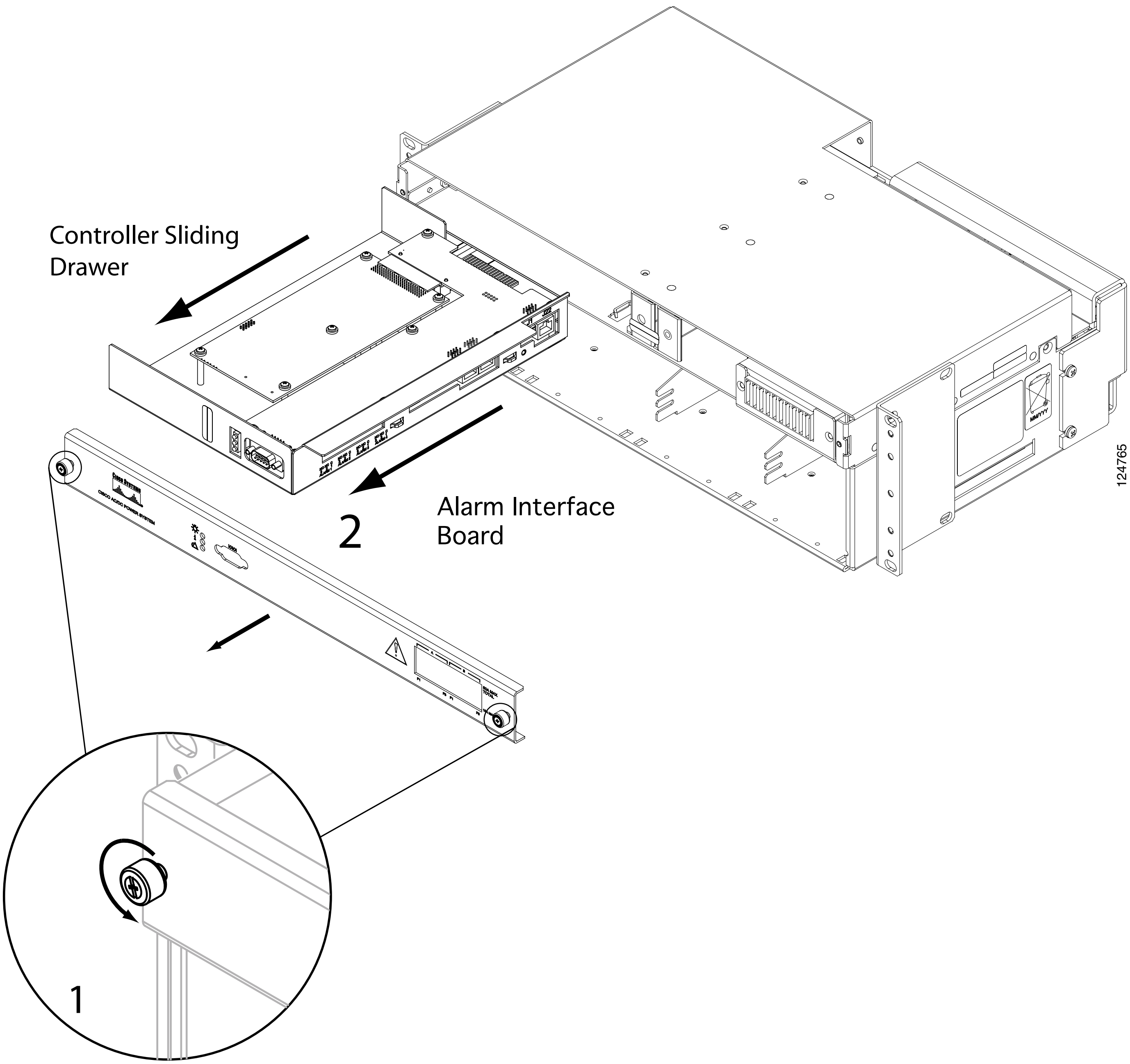
Step 13 To reinstall a replacement 1RU Distribution Shelf, comlete the "2.2.2 Install the 1 RU Distribution Shelf" procedure on page 2-6.

3.2.2 Replace the Controller Tray

Step 1 Locate the controller faceplate on the system shelf.

Step 2 Remove the controller faceplate by loosening the two front thumbscrews to access the sliding controller tray (Figure 3-3).

Figure 3-3 Removing the Controller Faceplate



Step 3 Slide the controller tray out and away from the system shelf to access the Alarm Interface Board (Figure 3-3 #2).

Step 4 Remove the Alarm Interface Board DC terminal block (Figure 3-4 or Figure 3-5 #1, depending on your controller hardware).

Step 5 Remove the alarm cable connections (Figure 3-4 or Figure 3-5 #2). If alarm cables are not labeled with the jumper number, label the cables with the appropriate jumper number: J16, J15, J14 (1,2,3), and J14 (4,5,6)/J13 (for the system without an LCD).

- –J16 terminal block

- –J15 terminal block
- –J14/J13 terminal blocks

Figure 3-4 Removing the Alarm Interface Board Cable on the Version 1 of the Controller Hardware

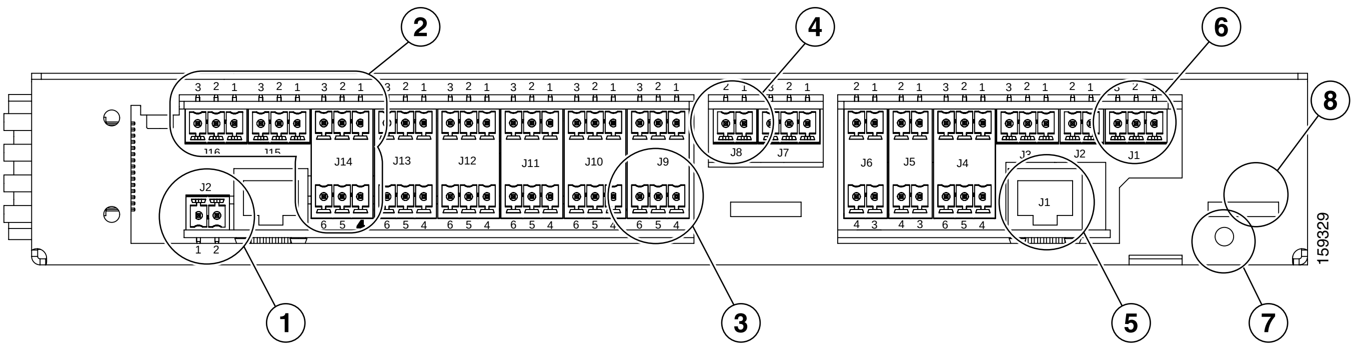
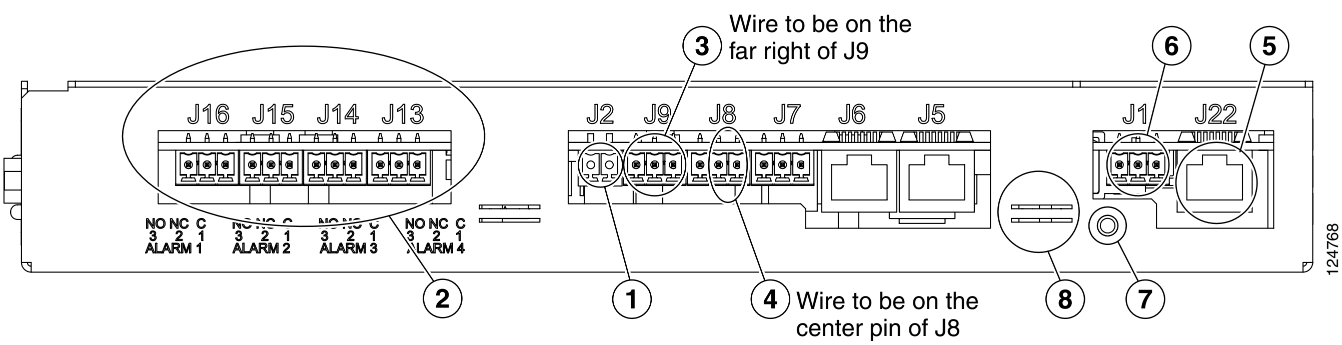


Figure 3-5 Removing the Alarm Interface Board Cable on the Version 2 of the Controller Hardware



Step 6 Remove the intra-shelf communications cabling:

- J9 terminal block (Figure 3-4 or Figure 3-5 #3)
- J8 terminal block (Figure 3-4 or Figure 3-5 #4)
- J1 Ethernet cable (Figure 3-4 or Figure 3-5 #5)
- J1 terminal block (Figure 3-4 or Figure 3-5 #6)

Step 7 Remove the controller tray ground connection by removing the Phillips screw (Figure 3-4 or Figure 3-5 #7).

Step 8 Remove the wire tie holding the controller tray in the system shelf (Figure 3-4 or Figure 3-5 #8).

Step 9 Pull the controller tray out of the system shelf.

Step 10 Install the replacement controller tray by placing it in the system shelf.

Step 11 Reinstall the controller tray ground connection by connecting the Phillips screw (Figure 3-4 or Figure 3-5 #7).

Step 12 Use a new wire tie to replace the one that was removed in Step 8.

Step 13 Reconnect the intra-shelf communications cabling (cables are labeled with the appropriate jumper number):

- J9 terminal block (Figure 3-4 or Figure 3-5 #3)

- J8 terminal block (Figure 3-4 or Figure 3-5 #4)
- J1 Ethernet cable (Figure 3-4 or Figure 3-5 #5)
- J1 terminal block (Figure 3-4 or Figure 3-5 #6)

Step 14 Reconnect the alarm cable connections (Figure 3-4 or Figure 3-5 #2).

- –J16 terminal block
- –J15 terminal block
- –J14/J13 terminal blocks

Step 15 Slide the controller tray back into the system shelf.

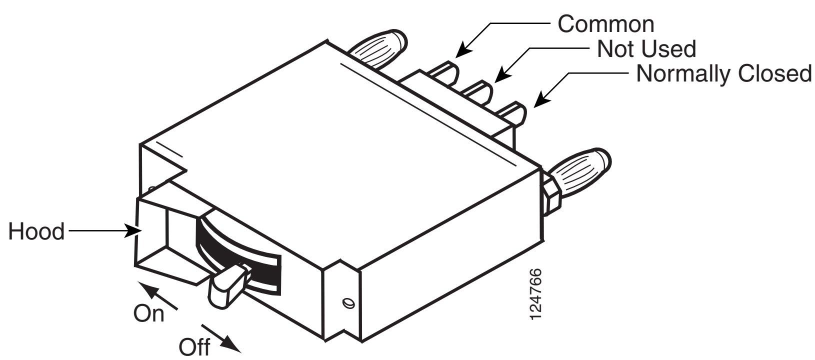
Step 16 Replace the controller faceplate by attaching it to the system shelf with the two front thumbscrews.

Step 17 After installing the controller, the controller and rectifier LEDs will blink. It may take a few minutes for the controller to communicate with all rectifiers. At this point, all rectifier output voltages will return to the programmed level. During this syncronization period output will not be affected.

3.2.3 Replace Circuit Breakers

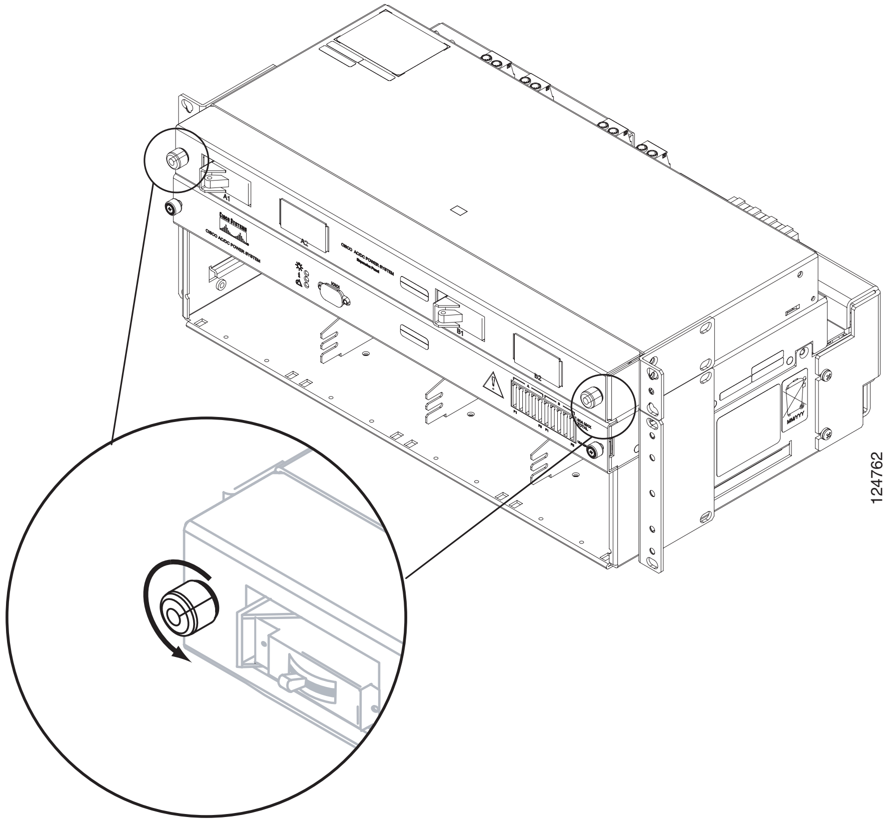
Step 1 Make certain all breakers to be replaced are in the OFF position (Figure 3-6).

Figure 3-6 Circuit Breaker On/Off Positions



Step 2 Remove the 1RU Distribution Shelf faceplate by loosening the two thumbscrews on the shelf faceplate (Figure 3-7).

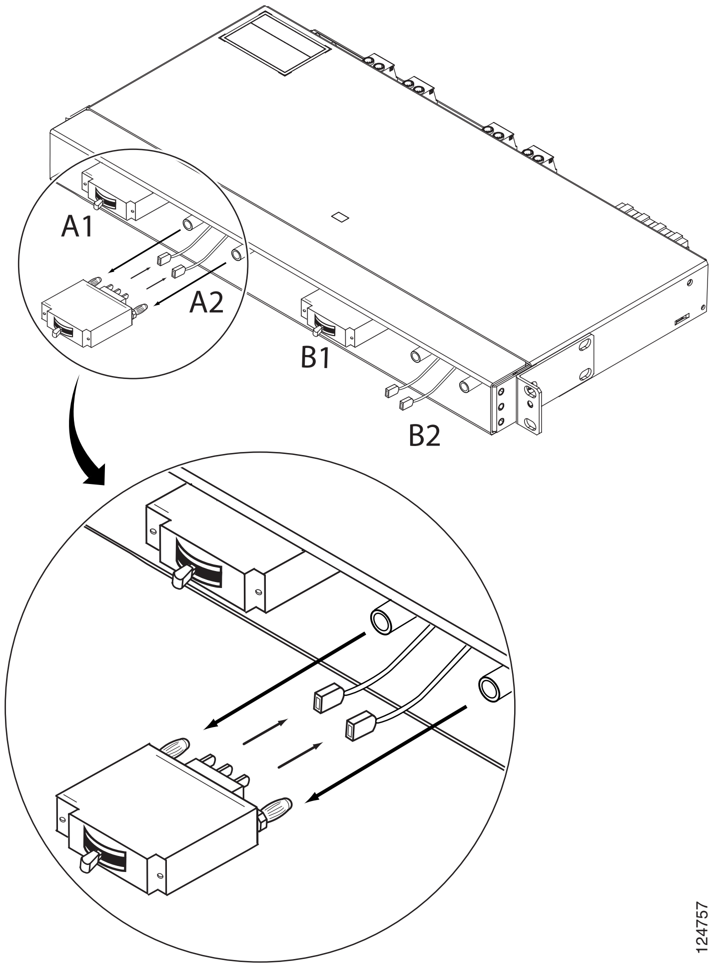
Figure 3-7 Removing the 1 RU Distribution Shelf Faceplate



Step 3 Locate the breaker that is to be removed.

Step 4 Grasp the breaker firmly at the front and pull out until the quick disconnects disengage from their mounts.

Figure 3-8 Removing a Circuit Breaker



Step 5 Remove the alarm cable connections from the rear of the breaker (Figure 3-8).

Step 6 Pull the breaker straight out from the 1RU Distribution Shelf.

Step 7 To reinstall a replacement 1RU Distribution Shelf see the "2.2.2 Install the 1 RU Distribution Shelf" procedure on page 2-6.

3.2.4 Replace a Rectifier

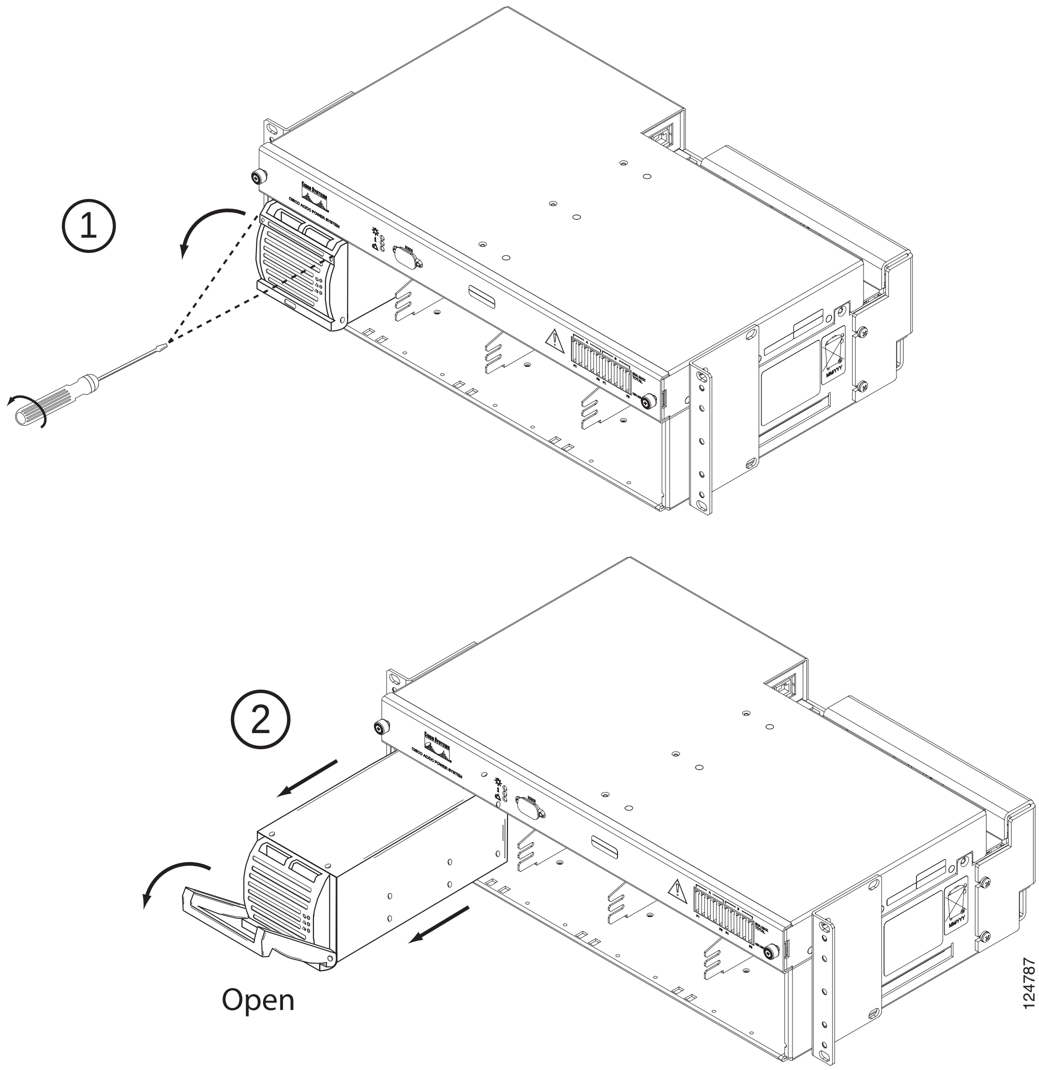
Note For more information on uninstalling a rectifier, see the "4.2.2.3 Remove Modules" section on page 4-3.

Step 1 Locate the rectifier that is to be removed.

Step 2 Loosen the mounting screws to allow the rectifier handle to open (Figure 3-9 #1).

Step 3 Grasp the top of the handle and pull down until the handle locks into the open position (Figure 3-9 #2).

Figure 3-9 Removing a Rectifier



Step 4 Grasp the handle and gently pull the module out and away from the shelf.

Caution The rectifier module may be hot when being pulled from the shelf. To avoid personal injury, wait until the rectifier has cooled before removing from the system shelf.

Step 5 Continue to pull the rectifier until it is halfway out of the shelf. Grasp the bottom of the rectifier with one hand and continue using the other hand to pull the rectifier out.

Step 6 Pull the rectifier out of the shelf. The system will generate a communication error, which will last until a new rectifier is inserted.

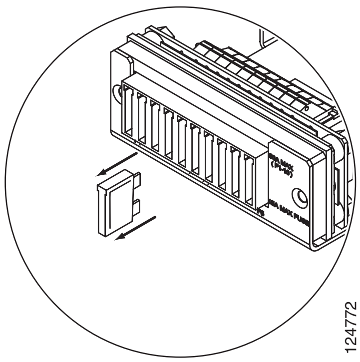
Step 7 For information on installing a rectifier module, see the "2.3.1 Install the Rectifiers" procedure on page 2-16.

3.2.5 Replace GMT Fuses

Step 1 Locate the GMT fuse that is to be removed.

Step 2 Grasp the fuse firmly at the front and pull out (Figure 3-10).

Figure 3-10 Removing a GMT Fuse



Step 3 For information on installing GMT fuses, see the "2.5.1 Install GMT Fuse Connections" procedure on page 2-25.

Caution When replacing GMT fuses, always use the same size fuse unless the GMT fuse output cabling is upgraded as well. For more information on the appropriate cable/fuse sizes, see Table 1-2 on page 1-6.



System Operation

4.1 System Commissioning

The following section should be used to power-up the system for the first time.

Step 1 Turn on AC breakers at the AC distribution panel to power up the shelf through the rectifiers.

Step 2 The controller and rectifier LEDs will start to blink. It may take a few minutes for the controller to communicate with all rectifiers.

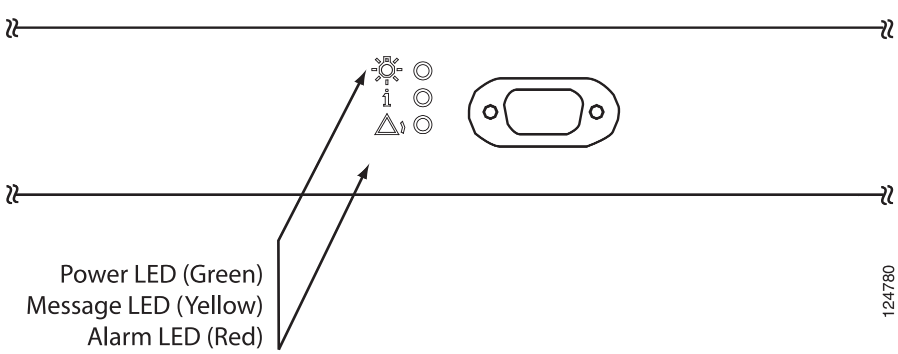
Step 3 The system is now commissioned. If the controller RED LED s on, refer to "Chapter 5, "System Troubleshooting."

4.2 General Information

The Power Control System (XCS) (Figure 4-1) is a supervisory system that is designed to control AC/DC power systems that are based on XR1648 rectifier modules.

Communication is accomplished through an alarm interface board and a backplane that connects to the rectifier modules.

Figure 4-1 System Control Unit



4.2.1 Alarm Interface Board and Connections

The alarm interface board is the main connection point for external communication inputs. The board is located inside the controller and can be accessed by removing the front controller cover and then sliding out the controller tray to expose the alarm connections (located on the right-hand side).

Alarm connections are made at the terminal block located on the Alarm/Interface PC board. The green connectors can be easily removed for ease in installing the wires into the connector; 22 AWG ($0.34mm^2$) wire is recommended for connecting alarms to the alarm output terminals (Figure 2-21 on page 2-24). External connections are Form C relay which can be monitored either Normally Closed or Normally Open. The four alarms are numbered 1 through 4. (Refer to Table 2-6 on page 2-23).

Note All alarm connections are for the unpowered state. When the power is off the NC is normally closed and when the power is on, the NC is open.

The following is a list of alarm board connections including descriptions and cabling:

- Alarms - Up to four Form C alarm contacts for remote signaling
- Load fuse and breaker monitoring
- RS232 Interface - External communications port (not utilized in this application)

4.2.2 Basic Controller Functions

The following section contains basic controller functions including starting the controller, adding modules, and removing modules from the system.

4.2.2.1 Start the Controller

When power is applied to the controller:

Step 1 The controller will spend several minutes analyzing the system and testing all addresses for connected rectifier modules. The green LED on the controller will blink. No alarms will be raised during this period.

Step 2 When the controller finds a module it will add it to the inventory.

4.2.2.2 Add Modules

When a rectifier is added to the system it will remain off until the controller detects it.

Step 1 When a rectifier is added to the system, its output voltage will walk-in, increasing up to its default setting. This will occur within 60 seconds.

Step 2 The controller constantly scans for new modules, but it may take a few minutes to recognize an inserted module.

Step 3 During this recognition time the controller may report module-related alarms and the red LED on the rectifier may turn on. These alarms are caused by imbalances related to load sharing of the rectifiers (the new rectifier’s output voltage is different than the existing rectifiers).

Step 4 The rectifier module will take a few minutes to step up to the correct voltage. At this point the controller will locate and adjust the rectifier module voltage to the correct output voltage and any alarms will be extinguished.

Step 5 To shorten the time that is needed to find new modules, the controller can be powered down and then powered up. This will cause the system to search for new modules faster. This is only recommended as a solution if it is important to shorten the time required for searching for new modules.

4.2.2.3 Remove Modules

Physically removing a module from the system creates a communication error indicated by the yellow LED on the controller. The yellow LED will remain on until a rectifier is installed.



CHAPTER 5

System Troubleshooting

This chapter contains information about troubleshooting and should be consulted in the event of a system malfunction.

The following is a list of potential problems and resolutions. If the first recommendation does not solve the problem, continue on to the next. If further assistance is needed, see the "Obtaining Technical Assistance" section on page xiv.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Note Most alarms will clear automatically when the cause has been cleared. Some alarms can be cancelled via the front panel push-buttons. In this case it will be indicated in the trouble shooting instructions.

Error Message `Low System Voltage (Red light on controller, Relay #1)`

Explanation

1. Rectifier failure
2. Loss of AC power on some or all rectifiers
3. Load exceeds rectifier capacity

Recommended Action

1. Replace faulty rectifier
2. Add one or more rectifiers to the system

Error Message `Mains Error (Yellow light on controller, Relay #2)`

Explanation AC supply off on two or more rectifiers

Recommended Action

1. Verify that the AC supply is available at the correct voltage
2. Verify that the AC input breaker is in the ON position

Error Message `Distribution Fuse/Breaker Failure (Red light on controller, Relay #4)`

Explanation

1. Tripped breaker
2. Fuse blown

Recommended Action

1. Localize the faulty breaker or blown fuse
2. Verify there are no short circuits in the cabling to the load
3. Reset breaker. If it trips again there is a problem with the breaker or the load
4. Replace breaker if required
5. Verify that there is no blown fuse. (If so, replace the blown fuse.) If the fuse blows again, there may be a problem with the load

Note Due to proprietary alarm wiring, a voltage will appear at the load terminal of the fuse even when the fuse is open. The voltage comes from a high impedance circuit used for blown fuse detection when a load is connected. This is not an energy hazard.

Error Message `High Load (Yellow light on controller)`

Explanation Load current exceeds 75%

Recommended Action

1. Check load current versus installed rectifier capacity. The alarm is generated when output load reaches 75% of rectifier capacity.
2. Add rectifier or reduce load.

Error Message `Module Failure (Red light on controller and Module, Relay #3)`

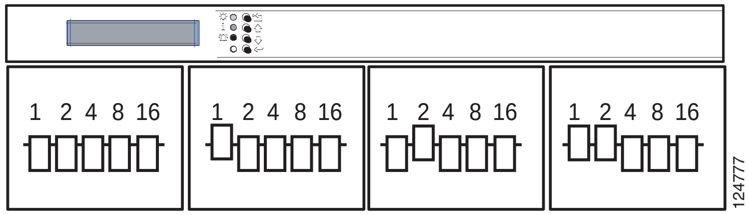
Explanation

1. Module failure
2. AC Off on a single rectifier
3. Current sharing fault

Recommended Action

1. Verify that the AC supply to the failed module is present at the right voltage.
2. Remove the faulty module, wait 30 seconds, and re-insert it. Wait up to four minutes for the controller to re-establish communication. If the module is still faulty, replace it with a new module.
3. Verify module address and resolve any address duplication (Figure 5-1). Rectifier address DIP switches are located at the inside rear of the rectifier shelf.

Figure 5-1 Module Locations



Note Sometimes the rectifier that indicates a failure is not the cause of the failure. The failure may be caused by a current share imbalance. If the failure persists even after replacing the rectifiers showing a fault, replace each rectifier in turn with a known good unit until the fault clears. The replaced module that clears the fault is the defective one.

Error Message `Urgent Module Failure (Red light on controller, Relay #3)`

Explanation More than one rectifier is reporting a module failure.

Recommended Action See module failure.

Error Message `Communication Failure (Yellow light on controller, flashing yellow light on module)`

Explanation

1. Controller is looking for the installed module
2. A module has been removed and not replaced
3. Broken or disconnected communication wire

Recommended Action

1. Wait for 5 minutes.
2. Verify that the module address is properly set and is not a duplicate of another address (Figure 5-1). Rectifier address DIP switches are located at the inside rear of the rectifier shelf.
3. Verify that the communication cable at the back of the rectifier shelf is connected.
4. Replace communication cable if required.



CHAPTER 6

System Parts List

This chapter contains a list of replacement parts and part numbers for the Cisco AC/DC Power System.

Table 6-1 Parts List

Description	Part Number
Main Shelf Assembly	CSCO-SM-PWR-SA
Rectifier Module	CSCO-PWR-RECT
Controller Module	CSCO-CNTRL-BRD
1RU DC Distribution Shelf	CSCO-EXP-PANEL
30A Circuit Breaker	CSCO-CKT-BRK
Ship Kit for Main Shelf Assembly	CSCO-SHP-KIT-1
Ship Kit for 1RU DC Distribution Shelf	CSCO-SHP-KIT-2
AC Power Cable for 110V AC North America	CSCO-PWR-CBL-NA1
AC Power Cable for 220V AC North America	CSCO-PWR-CBL-NA2
AC Power Cable for Argentina	CSCO-PWR-CBL-ARG
AC Power Cable for Australia	CSCO-PWR-CBL-AUS
AC Power Cable for China	CSCO-PWR-CBL-CHN
AC Power Cable for EU Member Nations	CSCO-PWR-CBL-EU
AC Power Cable for Italy	CSCO-PWR-CBL-ITL
AC Power Cable for Japan	CSCO-PWR-CBL-JPN
AC Power Cable for The United Kingdom	CSCO-PWR-CBL-UK



APPENDIX A

Translated Safety Warnings

This appendix contains the translated warnings included in the Cisco AC/DC Power System user documentation.

The translated safety warnings are listed in the following order:

1	English	**10**	Swedish	**19**	Croatian (in some)
2	Dutch	**11**	Hungarian	**20**	Czech (in some)
3	Finnish	**12**	Russian	**21**	Greek (in some)
4	French	**13**	Chinese	**22**	Hebrew (in some)
5	German	**14**	Japanese	**23**	Macedonian (in some)
6	Italian	**15**	Korean (in some)	**24**	Polish (in some)
7	Norwegian	**16**	Brazilian Portuguese (in some)	**25**	Slovakian (in some)
8	Portuguese	**17**	Danish (in some)		
9	Spanish	**18**	Arabic (in some)		

Statement 12—Power Supply Disconnection Warning

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.** Statement 12

Waarschuwing **Voordat u aan een frame of in de nabijheid van voedingen werkt, dient u bij wisselstroom toestellen de stekker van het netsnoer uit het stopcontact te halen; voor gelijkstroom toestellen dient u de stroom uit te schakelen bij de stroomverbreker.**

Varoitus **Kytke irti vaihtovirtalaitteiden virtajohto ja katkaise tasavirtalaitteiden virta suojakytkimellä, ennen kuin teet mitään asennuspohjalle tai työskentelet virtalähteiden läheisyydessä.**

Attention **Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif ; couper l'alimentation des unités en courant continu au niveau du disjoncteur.**

Warnung **Bevor Sie an einem Chassis oder in der Nähe von Netzgeräten arbeiten, ziehen Sie bei Wechselstromeinheiten das Netzkabel ab bzw. schalten Sie bei Gleichstromeinheiten den Strom am Unterbrecher ab.**

Avvertenza **Prima di lavorare su un telaio o intorno ad alimentatori, scollegare il cavo di alimentazione sulle unità CA; scollegare l'alimentazione all'interruttore automatico sulle unità CC.**

Advarsel **Før det utføres arbeid på kabinettet eller det arbeides i nærheten av strømforsyningsenheter, skal strømledningen trekkes ut på vekselstrømsenheter og strømmen kobles fra ved strømbryteren på likestrømsenheter.**

Aviso **Antes de trabalhar num chassis, ou antes de trabalhar perto de unidades de fornecimento de energia, desligue o cabo de alimentação nas unidades de corrente alternada; desligue a corrente no disjuntor nas unidades de corrente contínua.**

¡Advertencia! **Antes de manipular el chasis de un equipo o trabajar cerca de una fuente de alimentación, desenchufar el cable de alimentación en los equipos de corriente alterna (CA); cortar la alimentación desde el interruptor automático en los equipos de corriente continua (CC).**

Varning! **Innan du arbetar med ett chassi eller nära strömförsörjningsenheter skall du för växelströmsenheter dra ur nätsladden och för likströmsenheter bryta strömmen vid överspänningsskyddet.**

Figyelem **Mielőtt elkezdene dolgozni a házon vagy tápegységek közelében, húzza ki a váltóáramú készülékek tápkábelét; egyenáramú készülék esetén szakítsa meg az áramot az árammegszakítónál.**

Предупреждение Перед выполнением монтажных работ или других работ в непосредственной близости от источников питания отключите кабель электропитания от устройств с питанием переменным током. Устройства с питанием постоянным током отключите с помощью выключателя питания.

警告 在机架或电源附近工作时，请拔下交流设备的电源电缆，断开直流设备断路器的电源。

警告 シャーシの作業を行うとき、または電源装置の付近で作業するときは、事前にAC装置から電源コードを外してください。DC装置の場合は、回路ブレーカーで電源を切断します。

Statement 43—Jewelry Removal Warning

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Waarschuwing **Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.**

Varoitus **Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sähkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitäntänapoihin.**

Attention **Avant d'accéder à cet équipement connecté aux lignes électriques, ôter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés à l'alimentation et reliés à la terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.**

Warnung **Vor der Arbeit an Geräten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließlich Ringe, Ketten und Uhren) abnehmen. Metallgegenstände erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschlußklemmen angeschweißt werden.**

Avvertenza **Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo può saldarsi ai terminali.**

Advarsel **Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.**

Aviso **Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.**

¡Advertencia! **Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.**

Varning! **Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brännskador; metallobjekt kan också sammansvetsas med kontakterna.**

Figyelem **Mielőtt hálózati feszültséghez csatlakozó készülékkel kezd el dolgozni, vegye le magáról az ékszereket (például gyűrűt, nyakláncot, órát). A fém tárgyak felmelegszenek, ha hálózati feszültséghez és földhöz érnek, és súlyos égési sérülést okozhatnak, illetve a fém tárgyak hozzáforrhatnak a csatlakozókhoz.**

Предупреждение Прежде чем использовать оборудование, подключенное к электросети, снимите все украшения (включая кольца, ожерелья и часы). Металлические части нагреваются при соединении с источником питания и землей, что может привести к серьезным ожогам или привариванию металлических объектов к клеммам.

警告 在操作与电源线连接的设备以前，请取下首饰（包括戒指、项链和手表）。连接电源和接地后，金属物品会升温，可能导致严重灼伤，也可能使金属物品熔接在线端。

警告 電源に接続されている装置を取り扱う際は、事前に、指輪、ネックレス、腕時計などの装身具をはずしてください。金属のオブジェクトが電源とアースと接触すると、金属が過熱して大やけどをしたり、また金属類が端子に焼き付くことがあります。

Statement 1006—Chassis Warning for Rack-Mounting and Servicing

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Waarschuwing **Om lichamelijk letsel te voorkomen wanneer u dit toestel in een rek monteert of het daar een servicebeurt geeft, moet u speciale voorzorgsmaatregelen nemen om ervoor te zorgen dat het toestel stabiel blijft. De onderstaande richtlijnen worden verstrekt om uw veiligheid te verzekeren:**

- **Dit toestel dient onderaan in het rek gemonteerd te worden als het toestel het enige in het rek is.**
- **Wanneer u dit toestel in een gedeeltelijk gevuld rek monteert, dient u het rek van onderen naar boven te laden met het zwaarste onderdeel onderaan in het rek.**
- **Als het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.**

Varoitus **Kun laite asetetaan telineeseen tai huolletaan sen ollessa telineessä, on noudatettava erityisiä varotoimia järjestelmän vakavuuden säilyttämiseksi, jotta vältytään loukkaantumiselta. Noudata seuraavia turvallisuusohjeita:**

- **Jos telineessä ei ole muita laitteita, aseta laite telineen alaosaan.**
- **Jos laite asetetaan osaksi täytettyyn telineeseen, aloita kuormittaminen sen alaosasta kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.**
- **Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.**

Attention **Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnelþ:**

- **Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.**
- **Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.**
- **Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.**

Warnung **Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:**

- **Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.**
- **Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.**
- **Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.**

Avvertenza **Per evitare infortuni fisici durante il montaggio o la manutenzione di questa unità in un supporto, occorre osservare speciali precauzioni per garantire che il sistema rimanga stabile. Le seguenti direttive vengono fornite per garantire la sicurezza personale:**

- **Questa unità deve venire montata sul fondo del supporto, se si tratta dell'unica unità da montare nel supporto.**
- **Quando questa unità viene montata in un supporto parzialmente pieno, caricare il supporto dal basso all'alto, con il componente più pesante sistemato sul fondo del supporto.**
- **Se il supporto è dotato di dispositivi stabilizzanti, installare tali dispositivi prima di montare o di procedere alla manutenzione dell'unità nel supporto.**

Advarsel **Unngå fysiske skader under montering eller reparasjonsarbeid på denne enheten når den befinner seg i et kabinett. Vær nøye med at systemet er stabilt. Følgende retningslinjer er gitt for å verne om sikkerheten:**

- **Denne enheten bør monteres nederst i kabinettet hvis dette er den eneste enheten i kabinettet.**
- **Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinettet lastes fra bunnen og opp med den tyngste komponenten nederst i kabinettet.**
- **Hvis kabinettet er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinettet.**

Aviso **Para se prevenir contra danos corporais ao montar ou reparar esta unidade numa estante, deverá tomar precauções especiais para se certificar de que o sistema possui um suporte estável. As seguintes directrizes ajudá-lo-ão a efectuar o seu trabalho com segurança:**

- **Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.**
- **Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.**
- **Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.**

¡Advertencia! **Para evitar lesiones durante el montaje de este equipo sobre un bastidor, o posteriormente durante su mantenimiento, se debe poner mucho cuidado en que el sistema quede bien estable. Para garantizar su seguridad, proceda según las siguientes instrucciones:**

- **Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.**
- **Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.**
- **Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.**

Varning! **För att undvika kroppsskada när du installerar eller utför underhållsarbete på denna enhet på en ställning måste du vidta särskilda försiktighetsåtgärder för att försäkra dig om att systemet står stadigt. Följande riktlinjer ges för att trygga din säkerhet:**

- **Om denna enhet är den enda enheten på ställningen skall den installeras längst ned på ställningen.**
- **Om denna enhet installeras på en delvis fylld ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.**
- **Om ställningen är försedd med stabiliseringsdon skall dessa monteras fast innan enheten installeras eller underhålls på ställningen.**

Figyelem **A készülék rackbe történő beszerelése és karbantartása során bekövetkező sérülések elkerülése végett speciális óvintézkedésekkel meg kell őrizni a rendszer stabilitását.**
A személyes biztonsága érdekében tartsa be a következő szabályokat:

- **Ha a rackben csak ez az egy készülék található, a rack aljába kell beszerelni.**
- **Ha nincs teljesen tele az a rack, amelybe beszerelik a készüléket, alulról fölfelé haladva töltse fel a racket úgy, hogy a legnehezebb készülék kerüljön a rack aljába.**
- **Ha stabilizáló eszközök is tartoznak a rackhez, szerelje fel a stabilizátorokat, mielőtt beszerelné az egységet a rackbe, vagy karbantartást végezne rajta.**

Предупреждение Во избежание травм при монтаже и обслуживании устройства в стойке следует принять особые меры предосторожности, чтобы убедиться в устойчивости оборудования.
Для обеспечения безопасности работ необходимо соблюдать следующие правила.

- Если в стойке находится одно устройство, оно должно быть установлено в нижней части.
- При монтаже устройств в частично заполненную стойку устанавливайте оборудование снизу вверх, размещая наиболее тяжелые устройства в нижней части.
- Если стойка снабжена приспособлениями для стабилизации, их необходимо установить до начала монтажа или обслуживания оборудования.

警告 为避免在机架中安装或维修该部件时使身体受伤，您必须采取特殊的预防措施确保系统固定。以下是确保安全的原则：

- 如果此部件是机架中唯一的部件，应将其安装在机架的底部。
- 如果在部分装满的机架中安装此部件，请按从下往上的顺序安装各个部件，并且最重的组件应安装在机架的底部。
- 如果机架配有固定装置，请先装好固定装置，然后再在机架中安装或维修部件。

警告 この装置をラックに設置したり保守作業を行ったりするときは、人身事故を防ぐため、システムが安定しているかどうかを十分に確認する必要があります。次の注意事項に従ってください。

- ラックにこの装置を単独で設置する場合は、ラックの一番下に設置します。
- ラックに別の装置がすでに設置されている場合は、最も重量のある装置を一番下にして、重い順に下から上へ設置します。
- ラックに安定器具が付属している場合は、その安定器具を取り付けてから、装置をラックに設置するか、またはラック内の装置の保守作業を行ってください。

주의 이 장치를 랙에 장착하거나 서비스할 때 신체 부상을 방지하려면, 시스템이 안정된 상태를 유지하도록 특별히 주의해야 합니다. 사용자의 안전을 위해 다음 지침 사항을 준수하십시오.
- 이 장치가 랙에 장착되는 유일한 것일 경우, 랙의 맨 아래 부분에 장착되어야 합니다.
- 부분적으로 차 있는 랙에 이 장치를 장착할 경우, 가장 무거운 장치를 랙의 맨 아래 부분부터 차례로 장착하십시오.
- 안정기가 랙과 함께 제공되는 경우, 이 안정기를 설치한 후 이 장치를 랙에 장착하거나 서비스하십시오

Aviso **Para evitar lesões corporais ao montar ou dar manutenção a esta unidade em um rack, é necessário tomar todas as precauções para garantir a estabilidade do sistema. As seguintes orientações são fornecidas para garantir a sua segurança:**

- **Se esta for a única unidade, ela deverá ser montada na parte inferior do rack.**
- **Ao montar esta unidade em um rack parcialmente preenchido, carregue-o de baixo para cima com o componente mais pesado em sua parte inferior.**
- **Se o rack contiver dispositivos estabilizadores, instale-os antes de montar ou dar manutenção à unidade existente.**

Advarsel **For at forhindre legemesbeskadigelse ved montering eller service af denne enhed i et rack, skal du sikre at systemet står stabilt. Følgende retningslinjer er også for din sikkerheds skyld:**

- **Enheden skal monteres i bunden af dit rack, hvis det er den eneste enhed i racket.**
- **Ved montering af denne enhed i et delvist fyldt rack, skal enhederne installeres fra bunden og opad med den tungeste enhed nederst.**
- **Hvis racket leveres med stabiliseringsenheder, skal disse installeres for enheden monteres eller serviceres i racket.**

تحذير **لتجنب حدوث أي إصابات عند تركيب هذه الوحدة، يجب اتباع بعض الاحتياطات لضمان عمل النظام بشكل سليم.**
يتم ذكر الإرشادات التالية لضمان الأمان.
يجب تركيب هذه الوحدة في الجزء السفلي من الدولاب المتضمن قضبان إذا كانت هذه الوحدة هي الوحيدة في الدولاب الذي يحتوي على قضبان.
عند تركيب هذه الوحدة في دولاب شبه ممتلئ، قم برفع الدولاب من الجزء السفلي لأعلى بحيث يكون الجزء الأثقل وزناً أسفل الدولاب.
إذا كان الدولاب المتضمن قضباناً يحتوي على أجهزة حفظ التوازن، قم بتثبيت هذه الأجهزة قبل تركيب الوحدة في الدولاب.

Upozorenje **Kako ne bi došlo do tjelesnih ozljeda kod postavljanja ili servisiranja uređaja na polici, potrebno je poduzeti mjere predostrožnosti kako bi sustav uvijek bio stabilan. Sigurnost se može osigurati poštivanjem sljedećih smjernica:**
- **Ovaj uređaj treba ugraditi na dno police, ukoliko je to jedini uređaj na polici.**
- **Kod ugradnje uređaja u policu na kojoj se već nalaze drugi uređaji, policu treba opremati počevši od dna, te tako da se na dno stave najteži dijelovi.**
- **Ukoliko su na polici ugrađeni stabilizatori, njih montirajte prije ugradnje ili servisiranja uređaja na polici.**

Upozornění **Abyste předešli poranění osob při montáži nebo opravě zařízení v montážním rámu, musíte dodržovat zvláštní preventivní opatření pro zajištění udržení stability systému. Pro zajištění bezpečnosti obsluhy jsou určeny následující zásady:**
- **Pokud je toto zařízení jedinou jednotkou v montážním rámu, musí být namontováno na nejnižší místo rámu.**
- **Pokud je toto zařízení montováno do částečně obsazeného montážního rámu, obsazujte montážní rám ve směru zdola nahoru tak, aby byla nejtěžší součást nejníže.**
- **Pokud je montážní rám vybaven stabilizačními zařízeními, nainstalujte stabilizátory ještě před montáží nebo opravou zařízení v montážním rámu.**

Προειδοποίηση Για να αποφύγετε τον τραυματισμό κατά την τοποθέτηση ή τη συντήρηση αυτής της συσκευής σε αρθρωτό σύστημα, πρέπει να λάβετε ειδικές προφυλάξεις για να διασφαλίσετε τη σταθερότητα του συστήματος. Οι παρακάτω οδηγίες παρέχονται για να εξασφαλίσουν την ασφάλειά σας:
- Αυτή η συσκευή πρέπει να τοποθετείται στο κάτω μέρος του αρθρωτού συστήματος αν είναι η μοναδική συσκευή σε αυτό.
- Όταν τοποθετείτε αυτήν τη συσκευή σε εν μέρει γεμάτο αρθρωτό σύστημα, τοποθετήστε συσκευές στο αρθρωτό σύστημα από κάτω προς τα επάνω, με τη βαρύτερη συσκευή στο κάτω μέρος του συστήματος.
- Εάν το αρθρωτό σύστημα διαθέτει διατάξεις σταθεροποίησης, τοποθετήστε τους σταθεροποιητές πριν τοποθετήσετε ή συντηρήσετε τη συσκευή στο αρθρωτό σύστημα.

אזהרה כדי למנוע פציעה בעת הרכבת יחידה זו במעמד או טיפול בה, עליך לנקוט אמצעי זהירות מיוחדים כדי להבטיח את יציבות המערכת. הקווים המנחים הבאים ניתנים על מנת להבטיח את ביטחונך:
- אם יחידה זו היא יחידה בודדת במעמד, יש להרכיב את היחידה בחלקו התחתון של המעמד.
- בעת הרכבת יחידה זו במעמד המלא בחלקו, טען את המעמד החל בחלק התחתון וכלפי מעלה כאשר הרכיב הכבד ביותר נמצא בחלקו התחתון של המעמד.
- אם המעמד מסופק עם התקני ייצוב, התקן את המייצבים לפני הרכבה היחידה במעמד או טיפול בה.

Opomena За да се не повредите кога го монтирате или го сервисирате уредот на полица, мора да бидете особено претпазливи за да ја обезбедите стабилноста на системот. Следите напатствија се дадени за да ја осигураат Вашата безбедност:
- Уредот треба да се монтира најдолу на полицата ако е единствен уред на полицата.
- Кога го монтирате уредот на делумно пополнета полица, полнете ја полицата од дното кон врвот со најтешката компонента на дното на полицата.
- Ако полицата има стабилизаторски делови, наместете ги стабилизаторите пред да го монтирате или сервисирате уредот на полицата.

Ostrzeżenie **Aby zapobiec urazom podczas montażu lub serwisowania tego urządzenia w stojaku, należy zastosować szczególne środki ostrożności w celu zapewnienia stabilności układu. Poniżej przedstawiono wskazówki, których przestrzeganie zapewni bezpieczeństwo:**

- **Jeśli urządzenie to jest jedynym urządzeniem w stojaku, powinno być zamontowane na dole.**
- **W przypadku montażu urządzenia w częściowo zapełnionym stojaku należy instalować kolejne urządzenia od najniższego do najwyższego, przy czym element najcięższy powinien być zamontowany najniżej w stojaku.**
- **Jeśli stojak jest wyposażony w elementy stabilizujące, należy zamontować stabilizatory przed przystąpieniem do montażu lub serwisowania urządzeń w stojaku.**

Upozornenie **Aby ste predišli poraneniu osôb pri montáži alebo oprave zariadenia v montážnom ráme, musíte dodržiavať zvláštne preventívne opatrenia na zaistenie udržania stability systému. Na zaistenie bezpečnosti obsluhy sú určené nasledujúce zásady:**

- **Pokiaľ je toto zariadenie jedinou jednotkou v montážnom ráme, musí byť namontované na najnižšie miesto v ráme.**
- **Pokiaľ je toto zariadenie montované do čiastočne obsadeného montážneho rámu, obsadzujte montážny rám v smere zdola nahor tak, aby bola najťažšia súčasť najnižšie.**
- **Pokiaľ je montážny rám vybavený stabilizačnými zariadeniami, nainštalujte stabilizátory ešte pred montážou alebo opravou zariadenia v montážnom ráme.**

Statement 1017—Restricted Area

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Waarschuwing **Deze eenheid is bestemd voor installatie in plaatsen met beperkte toegang. Toegang tot een dergelijke plaats kan alleen verkregen worden door middel van een speciaal instrument, een slot en sleutel of een ander veiligheidsmiddel.**

Varoitus **Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Tällaiseen paikkaan pääsee vain erikoistyökalua, lukkoon sopivaa avainta tai jotakin muuta turvalaitetta käyttämällä.**

Attention **Cet appareil est à installer dans des zones d'accès réservé. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.**

Warnung **Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Der Zutritt zu derartigen Bereichen ist nur mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer sonstigen Sicherheitsvorkehrung möglich.**

Avvertenza **Questa unità è prevista per essere installata in un'area ad accesso limitato, vale a dire un'area accessibile solo mediante l'uso di un attrezzo speciale, come lucchetto e chiave, o altri dispositivi di sicurezza.**

Advarsel **Denne enheten er beregnet på installasjon i områder med begrenset tilgang. Et begrenset tilgangsområde kan bare nås ved hjelp av et spesielt verktøy, lås og nøkkel, eller andre sikkerhetsanordninger.**

Aviso **Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança.**

¡Advertencia! **Esta unidad ha sido diseñada para instalación en áreas de acceso restringido. Sólo puede obtenerse acceso a una de estas áreas mediante la utilización de una herramienta especial, cerradura con llave u otro medio de seguridad.**

Varning! **Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde kan endast tillträdas med hjälp av specialverktyg, lås och nyckel eller annan säkerhetsanordning.**

Figyelem **A készülék korlátozottan hozzáférhető területre történő beszerelésre készült. A korlátozottan hozzáférhető területekhez csak speciális szerszám, zár és kulcs vagy más biztonsági berendezés segítségével lehet hozzáférni.**

Предупреждение Данное устройство предназначено для установки в помещениях с ограниченным доступом. В такие помещения можно попасть, только имея специальное устройство доступа, карту или ключ или пройдя проверку другими средствами обеспечения безопасности.

警告 此部件应安装在限制进出的场所。限制进出的场所指只能通过使用特殊工具、锁和钥匙或其它安全手段进出的场所。

警告 この装置は立ち入り制限区域内に設置することが前提になっています。立ち入り制限区域とは、鍵、錠、またはその他の保全手段を使用しないと立ち入ることができない区域です。

주의 이 장치는 접근이 제한된 영역에 설치하도록 제작되었습니다. 특수 도구, 잠금 장치 및 키, 또는 기타 보안 수단을 통해서만 이 접근 제한 영역에 액세스할 수 있습니다.

Aviso **Esta unidade deve ser instalada em áreas de acesso restrito. Uma área de acesso restrito só pode ser acessada com o uso de uma ferramenta especial, cadeado e chave ou outros meios de segurança.**

Advarsel **Denne enhed er beregnet til installation i områder med begrænset adgang. Der kan kun opnås adgang til et begrænset område ved at bruge et særligt stykke værktøj, lås og nøgle, eller en anden form for sikkerhed.**

تحذير **تم تخصيص هذه الوحدة ليتم تثبيتها في مناطق محظور الوصول إليها. يمكن الوصول إلى المنطقة المحظورة فقط من خلال استخدام أداة خاصة أو قفل أو مفتاح أو أي وسيلة أخرى من التأمين.**

Upozorenje **Uređaj je namijenjen ugradnji na teško dostupnim mjestima. Teško su dostupna mjesta takva mjesta koja su dostupna samo uz pomoć posebnih alata, lokota i ključa, ili nekog drugog načina osiguravanja sigurnosti.**

Upozornění **Toto zařízení je určeno pro instalaci v prostorech s omezeným přístupem. Do prostoru s omezeným přístupem lze získat přístup pouze pomocí zvláštního nástroje, zámku a klíče nebo jiných zabezpečovacích prostředků.**

Προειδοποίηση Αυτή η συσκευή προορίζεται για να τοποθετηθεί σε χώρους στους οποίους η πρόσβαση είναι περιορισμένη. Η πρόσβαση σε ένα χώρο με περιορισμένη πρόσβαση είναι δυνατή μόνο με τη χρήση ενός ειδικού εργαλείου, κλειδαριάς και κλειδιού ή άλλου μέσου ασφαλείας.

אזהרה יחידה זו מיועד להתקנה באזורים עם גישה מוגבלת. הגישה לאזורים המיועדים לגישה מוגבלת אפשרית רק באמצעות כלי מיוחד, מנעול ומפתח, או אמצעי בטיחות אחרים.

Opomena Уредот е наменет за местење во области со ограничен пристап. Во областите со ограничен пристап може да се влезе само со употреба на специјална алатка, брава и клуч или со други средства за обезбедување.

Ostrzeżenie **To urządzenie jest przystosowane do instalacji w miejscach o ograniczonym dostępie. Przez miejsce o ograniczonym dostępie rozumie się miejsce, do którego dostęp uzyskać można wyłącznie za pomocą specjalnego narzędzia, zamka z kluczem lub innego zabezpieczenia.**

Upozornenie **Toto zariadenie je určené na inštaláciu v priestoroch s obmedzeným prístupom. Do priestoru s obmedzeným prístupom je možné získať prístup iba pomocou špeciálneho nástroja, zámku a kľúča, alebo iných zabezpečovacích prostriedkov.**

Statement 1024—Ground Conductor

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Waarschuwing **Deze apparatuur dient geaard te zijn. De aardingsleiding mag nooit buiten werking worden gesteld en de apparatuur mag nooit bediend worden zonder dat er een op de juiste wijze geïnstalleerde aardingsleiding aanwezig is. Neem contact op met de bevoegde instantie voor elektrische inspecties of met een elektricien als u er niet zeker van bent dat er voor passende aarding gezorgd is.**

Varoitus **Laitteiden on oltava maadoitettuja. Älä koskaan ohita maajohdinta tai käytä laitteita ilman oikein asennettua maajohdinta. Ota yhteys sähkötarkastusviranomaiseen tai sähköasentajaan, jos olet epävarma maadoituksen sopivuudesta.**

Attention **Cet équipement doit être mis à la masse. Ne jamais rendre inopérant le conducteur de masse ni utiliser l'équipement sans un conducteur de masse adéquatement installé. En cas de doute sur la mise à la masse appropriée disponible, s'adresser à l'organisme responsable de la sécurité électrique ou à un électricien.**

Warnung **Dieses Gerät muss geerdet sein. Auf keinen Fall den Erdungsleiter unwirksam machen oder das Gerät ohne einen sachgerecht installierten Erdungsleiter verwenden. Wenn Sie sich nicht sicher sind, ob eine sachgerechte Erdung vorhanden ist, wenden Sie sich an die zuständige Inspektionsbehörde oder einen Elektriker.**

Avvertenza **Questa apparecchiatura deve essere dotata di messa a terra. Non escludere mai il conduttore di protezione né usare l'apparecchiatura in assenza di un conduttore di protezione installato in modo corretto. Se non si è certi della disponibilità di un adeguato collegamento di messa a terra, richiedere un controllo elettrico presso le autorità competenti o rivolgersi a un elettricista.**

Advarsel **Dette utstyret må jordes. Omgå aldri jordingslederen og bruk aldri utstyret uten riktig montert jordingsleder. Ta kontakt med fagfolk innen elektrisk inspeksjon eller med en elektriker hvis du er usikker på om det finnes velegnet jordning.**

Aviso **Este equipamento deve ser aterrado. Nunca anule o fio terra nem opere o equipamento sem um aterramento adequadamente instalado. Em caso de dúvida com relação ao sistema de aterramento disponível, entre em contato com os serviços locais de inspeção elétrica ou um eletricista qualificado.**

¡Advertencia! **Este equipo debe estar conectado a tierra. No inhabilite el conductor de tierra ni haga funcionar el equipo si no hay un conductor de tierra instalado correctamente. Póngase en contacto con la autoridad correspondiente de inspección eléctrica o con un electricista si no está seguro de que haya una conexión a tierra adecuada.**

Varning! **Denna utrustning måste jordas. Koppla aldrig från jordledningen och använd aldrig utrustningen utan en på lämpligt sätt installerad jordledning. Om det föreligger osäkerhet huruvida lämplig jordning finns skall elektrisk besiktningsauktoritet eller elektriker kontaktas.**

Figyelem **A berendezés csak megfelelő védőföldeléssel működtethető. Ne iktassa ki a földelés csatlakozóját, és ne üzemeltesse a berendezést szabályosan felszerelt földelő vezeték nélkül! Ha nem biztos benne, hogy megfelelő földelés áll rendelkezésbe, forduljon a helyi elektromos hatóságokhoz vagy egy villanyszerelőhöz.**

Предупреждение Данное устройство должно быть заземлено. Никогда не отключайте провод заземления и не пользуйтесь оборудованием при отсутствии правильно подключенного провода заземления. За сведениями об имеющихся возможностях заземления обратитесь к соответствующим контролирующим организациям по энергоснабжению или к инженеру-электрику.

警告 此设备必须接地。切勿使接地导体失效，或者在没有正确安装接地导体的情况下操作该设备。如果您不能肯定接地导体是否正常发挥作用，请咨询有关电路检测方面的权威人士或电工。

警告 この装置はアース接続する必要があります。アース導体を破損しないよう注意し、アース導体を正しく取り付けないまま装置を稼働させないでください。アース接続が適正であるかどうか分からない場合には、電気検査機関または電気技術者に相談してください。

Statement 1030—Equipment Installation

Warning	**Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030
Waarschuwing	**Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door bevoegd geschoold personeel.**
Varoitus	**Tämän laitteen saa asentaa, vaihtaa tai huoltaa ainoastaan koulutettu ja laitteen tunteva henkilökunta.**
Attention	**Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.**
Warnung	**Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.**
Avvertenza	**Questo apparato può essere installato, sostituito o mantenuto unicamente da un personale competente.**
Advarsel	**Bare opplært og kvalifisert personell skal foreta installasjoner, utskiftninger eller service på dette utstyret.**
Aviso	**Apenas pessoal treinado e qualificado deve ser autorizado a instalar, substituir ou fazer a revisão deste equipamento.**
¡Advertencia!	**Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.**
Varning!	**Endast utbildad och kvalificerad personal bör få tillåtelse att installera, byta ut eller reparera denna utrustning.**
Figyelem	**A berendezést csak szakképzett személyek helyezhetik üzembe, cserélhetik és tarthatják karban.**
Предупреждение	Установку, замену и обслуживание этого оборудования может осуществлять только специально обученный квалифицированный персонал.
警告	只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。
警告	この装置の設置、交換、保守は、訓練を受けた相応の資格のある人が行ってください。
주의	교육을 받고 자격을 갖춘 사람만 이 장비를 설치, 교체, 또는 서비스를 수행해야 합니다.
Aviso	**Somente uma equipe treinada e qualificada tem permissão para instalar, substituir ou dar manutenção a este equipamento.**

Advarsel **Kun uddannede personer må installere, udskifte komponenter i eller servicere dette udstyr.**

تحذير يسمح للفنيين المتخصصين فقط بتركيب المعدة أو استبدالها أو إجراء الصيانة عليها.

Upozorenje **Uređaj smije ugrađivati, mijenjati i servisirati samo za to obučeno i osposobljeno servisno osoblje.**

Upozornění **Instalaci, výměnu nebo opravu tohoto zařízení smějí provádět pouze proškolené a kvalifikované osoby.**

Προειδοποίηση Η τοποθέτηση, η αντικατάσταση και η συντήρηση του εξοπλισμού επιτρέπεται να γίνονται μόνο από καταρτισμένο προσωπικό με τα κατάλληλα προσόντα.

אזהרה רק עובדים מיומנים ומוסמכים רשאים להתקין, להחליף, או לטפל בציוד זה.

Opomena Местењето, заменувањето и сервисирањето на оваа опрема треба да му биде дозволено само на обучен и квалификуван персонал.

Ostrzeżenie **Do instalacji, wymiany i serwisowania tych urządzeń mogą być dopuszczone wyłącznie osoby wykwalifikowane i przeszkolone.**

Upozornenie **Inštaláciu, výmenu alebo opravu tohto zariadenia smú vykonávať iba vyškolené a kvalifikované osoby.**

Statement 1033—SELV-IEC 60950 DC Power Supply

Warning **Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards.** Statement 1033

Waarschuwing **Sluit de eenheid alleen maar aan op een gelijkstroombron die voldoet aan de veiligheidsvereisten voor extra-laag voltage (SELV) in de op IEC 60950 gebaseerde veiligheidsnormen.**

Varoitus **Liitä laite ainoastaan tasavirtalähteesen, joka on yhdenmukainen IEC 60950:n suojattujen erittäisen alhaisen jännitteen (SELV) turvavaatimusten kanssa.**

Attention **Connectez l'unité uniquement à une alimentation CC compatible avec les recommandations SELV (safety extra-low voltage) des normes de sécurité IEC 60950.**

Warnung **Schließen Sie die Einheit nur an eine Gleichstrom-Stromquelle an, die mit den Safety Extra-Low Voltage (SELV)-Anforderungen in den auf IEC 60950 basierenden Sicherheitsstandards übereinstimmen.**

Avvertenza **Collegare l'unità esclusivamente a una presa di corrente continua rispondente ai requisiti SELV (safety extra-low voltage) in base alle norme di sicurezza IEC 60950.**

Advarsel **Koble bare enheten til en likestrømsforsyning som er i henhold til kravene for lavspenning (SELV) i IEC 60950-baserte sikkerhetsstandarder.**

Aviso **Conecte a unidade apenas à fonte da energia de CC que se encontra em conformidade com os requisitos dos circuitos de segurança de baixa tensão (SELV) constantes dos padrões de segurança baseados no IEC 60950.**

¡Advertencia! **Conecte la unidad sólo en una fuente de energía DC que cumpla con los requisitos de voltaje extra bajo (SELV - safety extra-low voltage) en los estándares de seguridad IEC 60950.**

Varning! **Anslut enheten endast till en likströmsförsörjningsenhet som uppfyller kraven för SELV (skyddskretsar för mycket låg spänning) i IEC 60950-baserade säkerhetsstandarder.**

Figyelem **Csak olyan, váltakozó feszültségű áramforráshoz csatlakoztassa a készüléket, amely megfelel az IEC 60950-es számú biztonsági szabványon alapuló biztonságos törpefeszültségi (SELV) követelményeknek.**

Предупреждение Это устройство можно подключать только к источнику постоянного тока, соответствующему требованиям к цепям безопасного низковольтного напряжения (SELV) стандарта безопасности IEC 60950.

警告 请只将该部件连接到符合基于 IEC 60950 的安全标准中安全特低电压 (SELV) 要求的直流电源上。

警告 この装置は、安全規格に基づくIEC 60950のSafety Extra-Low Voltage（SELV）要件を満たすDC電源にのみ接続してください。

Statement 1047—Overheating Prevention

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:**
55°C (131°F) Statement 1047

Waarschuwing **Om te voorkomen dat het systeem oververhit raakt, dient u het niet te gebruiken in een ruimte waar de maximaal aanbevolen omgevingstemperatuur van**
55°C (131°F) wordt overschreden.

Varoitus **Jotta järjestelmä ei kuumentuisi liikaa, sitä ei saa käyttää liian kuumassa ympäristössä. Suosituksen mukainen käyttölämpötila on enintään**
55°C (131°F)

Attention **Pour éviter toute surchauffe du système, il est recommandé de maintenir une température ambiante inférieure à**
55°C (131°F)

Warnung **Um das System vor Überhitzung zu schützen, vermeiden Sie dessen Verwendung in einem Bereich, in dem die Umgebungstemperatur das empfohlene Maximum von**
55°C (131°F) überschreitet.

Avvertenza **Per evitare che il sistema si surriscaldi, non utilizzatelo dove la temperatura ambiente sia superiore alla temperatura massima raccomandata di**
55°C (131°F)

Advarsel **For å hindre at systemet blir overopphetet, må det ikke brukes på et sted der temperaturen overstiger den maksimalt anbefalte temperaturen på**
55°C (131°F)

Aviso **Para evitar o sobreaquecimento do sistema, não o opere em áreas que excedam a temperatura ambiente máxima recomendada de**
55°C (131°F)

¡Advertencia! **Para impedir que el sistema se recaliente, no lo utilice en zonas en las que la temperatura ambiente llegue a los**
55°C (131°F)

Varning! **Förhindra att systemet överhettas genom att inte använda det på en plats där den rekommenderade omgivningstemperaturen överstiger**
55°C (131°F)

Figyelem **A túlmelegedés megelőzése végett ne üzemeltesse a rendszert olyan területen, ahol a hőmérséklet meghaladja a következő maximális ajánlott környezeti hőmérsékletet:**
55°C (131°F)

Предупреждение Во избежание перегрева устройства его не следует использовать в помещениях, в которых температура воздуха выше максимальной рекомендованной:
55°C (131°F)

警告 为了防止系统过热，不要在超过所建议的最大环境温度下运行该系统：
55°C (131°F)

警告 システムが過熱状態にならないようにするため、最大気温が以下の温度を超える場所ではシステムを稼働させないでください。
55°C (131°F)

Statement 1074—Comply with Local and National Electrical Codes

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Waarschuwing **Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.**

Varoitus **Laitteisto tulee asentaa paikallisten ja kansallisten sähkömääräysten mukaisesti.**

Attention **L'équipement doit être installé conformément aux normes électriques nationales et locales.**

Warnung **Die Installation der Geräte muss den Sicherheitsstandards entsprechen.**

Avvertenza **L'installazione dell'impianto deve essere conforme ai codici elettrici locali e nazionali.**

Advarsel **Installasjon av utstyret må samsvare med lokale og nasjonale elektrisitetsforskrifter.**

Aviso **A instalação do equipamento tem de estar em conformidade com os códigos eléctricos locais e nacionais.**

¡Advertencia! **La instalación del equipo debe cumplir con las normativas de electricidad locales y nacionales.**

Varning! **Installation av utrustningen måste ske i enlighet med gällande elinstallationsföreskrifter.**

Figyelem **A berendezés üzembe helyezését a helyi és a nemzeti elektromossági előírások figyelembevételével kell elvégezni.**

Предупреждение **Установка оборудования должна соответствовать местным и национальным электротехническим нормам.**

警告 设备安装必须符合本地与本国电气法规。

警告 機器の取り付けは地域および国内の電気工事規定に遵守する必要があります。